BUSINESS PERFORMANCE OF CHINESE ENTERPRISES IN A RELATIONAL PERSPECTIVE

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Dedication

This dissertation is dedicated to my family
with love and appreciation.

Abstract

This study provides a causal explanation and a statistical analysis of how corporate social capital promotes business performance of small- and medium-sized enterprises (SMEs) in China. The central argument of this study is that the formation and mobilization of corporate social capital are culturally and institutionally contextualized. China is an exemplary case. Through interviews and an analysis of 830 SMEs sampled in the Pearl River Delta Region of China, I will show how Chinese SME entrepreneurs formed and mobilized corporate social capital from multiplex and reciprocal strong ties to other entrepreneurs and non-economic organizations, and how such ties increased their business performance. This study makes both theoretical and methodological contributions to social capital research. Theoretically, I conceptualize *guanxi*, the Chinese expression of social connections, as an *isotopic* social capital, decompose *guanxi* to its analytical dimensions, and relate *guanxi* dimensions to business performance. Methodologically, I construct measures of *guanxi* ties among Chinese SME entrepreneurs, and for the first time in the long tradition of *guanxi* research I establish and assess counterfactual models in which to investigate the causal effect of *guanxi*-based social capital on business performance.

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Chapter 1 Introduction and Overview

This study provides a causal explanation and a statistical analysis of how corporate social capital promotes business performance of small- and medium-sized enterprises (SMEs) in China. Corporate social capital is defined as "processes by which social actors create and mobilize their network connections within and between organizations to gain access to other actors' resources" (Knoke, 1999, p. 18), and in Western countries these resources have been found to improve performance of enterprises (Brass, Galaskiewicz, Greve, & Tsai, 2004). The central argument of this study is that the formation and mobilization of corporate social capital are culturally and institutionally contextualized. China is an exemplary case. Through in-depth interviews and an analysis of 830 SMEs sampled in the Pearl River Delta Region of China, I will show how Chinese SME entrepreneurs formed and mobilized corporate social capital from multiplex and reciprocal strong ties to other entrepreneurs and non-economic organizations, and how such ties increased their business performance.

This study is designed to make both theoretical and methodological contributions to social capital research. Theoretically, I conceptualize *guanxi*, the Chinese expression of social connections, as an *isotopic* social capital, decompose *guanxi* to its analytical dimensions, and relate *guanxi* dimensions to business performance. Methodologically, I construct measures of *guanxi* ties among Chinese SME entrepreneurs, and for the first time in the long tradition of *guanxi* research I establish and assess counterfactual models in which to investigate the causal effect of *guanxi*-based social capital on business performance.

This study is situated in the context of China's on-going economic reforms. Since 1978, China has achieved an average annual GDP growth rate of 9.8 percent.[1] This long-term

[1] National Bureau of Statistics of People's Republic of China (http://www.stats.gov.cn/tjzs/tjsj/tjcb/dysj/201412/t20141231_662243.html).

and high-speed economic growth is powered by the prosperity of China's rapidly expanding private sector, especially the mushrooming SMEs. Starting at almost zero in 1978, the number of privately owned businesses has been increasing continually. Along with its constantly increasing numbers, the private sector is making more and more important contributions to China's economy. In terms of GDP share, private businesses contributed more than 60 percent of GDP in 2013.[2] In regard to creating job opportunities, the private sector provided more than half of all urban jobs in 1995, and that fraction exceeded 70 percent in 2009.[3] In terms of international trade, China became the largest exporting country in 2009 with total exports of $1.2 trillion,[4] of which $0.48 trillion[4] came from private businesses.

1.1 Research Question and Competing Theories

How can we explain the business success of private enterprises in China? What makes this issue more puzzling is the fact that "private-sector growth in China has taken place in an environment that is openly hostile to entrepreneurs and private businesses" (Tsai, 2002). It is true that China's economic reform provides the institutional possibility for the emergence of private enterprises and stimulates entrepreneurship of Chinese people. However, the gradual nature of China's reform from Mao's redistributive system to Deng's market economy generated a business environment that is drastically different from the free market defined by Western economists. Some market sectors and transactions are still under the tight control of the government and giant state-owned enterprises, such as financial services, land and natural resources, energy, telecommunication, and international trade. Codified and high-quality market

[2] *People's Daily* (http://paper.people.com.cn/rmrb/html/2013-02/03/nw.D110000renmrb_20130203_8-01.htm).
[3] China Data Online (http://chinadataonline.org/).
[4] http://news.xinhuanet.com/fortune/2011-02/08/c_13722111.htm.

information is still a very scarce resource and tends to be circulated among insiders rather than widely diffused across business networks (Martinsons & Westwood, 1997). The level of general trust is still very low, and legal regulations of business behaviors are still difficult to enforce (Martinsons, 2008). As a legacy of the central-planned economy of Mao's era, local governments still embrace the idea of regional protectionism and direct interference in daily business operations (see Fan's explanation of the Marketization Index 2007). Facing this market economy with Chinese characteristics, how do private businesses, especially more-vulnerable SMEs, manage to survive and achieve performance in such a challenging environment?

Four competing theories from two perspectives attempt to answer this challenging question. As summarized in the left panel of Figure 1–1, two nonrelational theories, transaction cost theory and institutional theory, are widely adopted explanations of business performance in the management literature. These nonrelational theories treat enterprises as open systems that are constantly adapting to external market and social environments. The transaction cost theory relates performance to searching and monitoring costs of business transactions, which are largely determined by specific market environment in a given industry. The institutional theory, however, puts more emphasis on how overall social, cultural, and institutional factors shape management practices and in turn determine performance. No matter how many social factors are considered, these theories are still labeled as nonrelational mainly because of their assumptions that (1) entrepreneurs as *Homo economicus* make rational or bounded rational choices to reach optimal and suboptimal results; and (2) enterprises are open to business environment rather than embedded in concrete social relations.

Compared to nonrelational theories, theories of the relational perspective (right-hand panel of Figure 1–1) accommodate business activities into concrete social connections. Relational theories emphasize the productive features of informal and grassroots social networks and social capital, and as a result they can provide more convincing explanations of the development of private businesses in China's gradual economic

reform (Nee & Opper, 2012). Fong and Chen (2007) provide support to the relational perspective by suggesting that in order to survive a hostile macroeconomic structure "entrepreneurs are more likely to obtain resources by using networks … [and] more likely to rely on [family/kinship ties] to obtain sensitive resources, such as those related to government contacts and funding resources."

This dissertation uses interviews and survey data of Chinese SMEs to examine relative merits of these competing theories and promotes the importance of understanding performance of Chinese SMEs via the relational perspective.

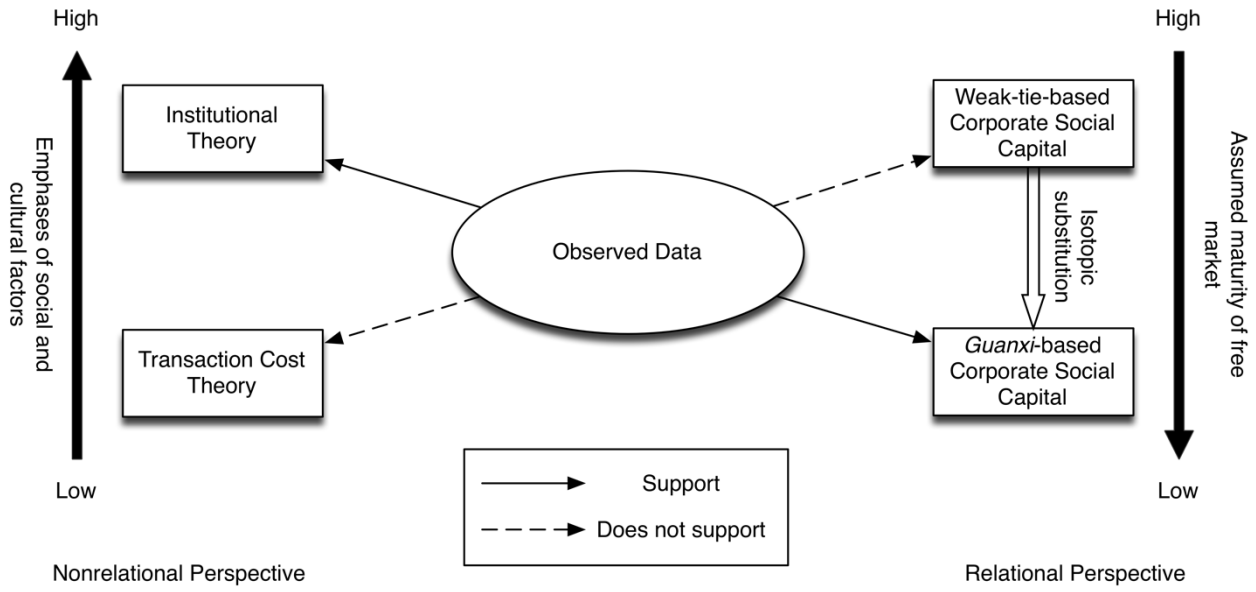

Figure 1–1 Competing theories and their relative efficiency in explaining the business performance of Chinese SMEs.

1.2 Overview of Chapters

The remainder of this dissertation comprises five chapters. The contents of each chapter are briefly summarized below.

Chapter 2 accomplishes two tasks – literature review and theory building. This chapter starts with a brief review of nonrelational theories of business performance. The core literature and empirical findings of transaction cost theory and institutional theory are reviewed in this order. This review thus illustrates the increasing theoretical prominence of social and cultural reasons for business performance from one theory to another. Two nonrelational propositions of business performance are developed, to situate this research in fields of management and organizational sociology. This chapter next moves to reviews of social capital theories and studies of Chinese *guanxi*. At the end of this chapter, I develop three theoretical propositions on the productive features of particularism, multiplexity, and obligations. Each proposition is followed by an interview to vividly illustrate how particular and multifunctional strong ties with moral obligations of reciprocity generate productive advantages for Chinese SMEs.

Chapter 3 describes survey data and statistical methods that I will use to examine the merits of competing propositions formulated in the previous chapter. It begins with a description of the 2003 Pearl River Delta entrepreneur survey, sampling design, geographic distribution of samples, and overall quality of this survey data. The chapter then continues to cover measures of dependent, independent, and control variables. Summary statistics and probability distributions of measures are discussed. Some measures are derived from complex calculations, and the necessity of performing these calculations is justified. Next, using these measures, propositions in Chapter 2 are operationalized into testable hypotheses. Finally, this chapter outlines my modeling strategies and justifies the use of counterfactual models to solve the endogenous issue of *guanxi* measures.

Chapter 4 examines nonrelational and relational hypotheses by using conventional OLS models. These linear regression models assume parallel causality. With this assumption, the independent variables of those hypotheses were treated as strictly exogenous reasons for business performance. Regressions in Chapter 4 show that the institutional explanation of performance is supported by observed data while transaction cost theory is

not statistically significant (See solid and dashed arrows in Figure 1–1). Results clearly suggest that from the nonrelational perspective of business performance, the explanation power of theories is positively related to their emphasis on social and cultural embeddedness. Compared to theories that mainly focus on market and transaction-related factors, institutional theory situates business behaviors into broader social and cultural institutions and as a result yields its superior explanation power. Regression models also show significant, positive, and linear effects of the three relational measures. These results imply that from the relational perspective, corporate social capital based on entrepreneurs' strong, multifunctional, and reciprocal social ties with their important business partners is better able to explain variations in performance than social capital derived from weak and function-specific social ties of instrumental rationality.

Chapter 5 is the core analytic chapter of the dissertation and it demonstrates my methodological contributions. Competing theories in both perspectives are tested in Chapter 4 using linear regression models that assume parallel causal effects on performance. Like Mouw's (2003) challenge of the causal effects of social capital, in this research effects of corporate social capital are not free from confoundedness.

To solve this problem of causality, two model-based and two data-based counterfactual modeling strategies are conducted in Chapter 5 including model-based methods of treatment effect model and the doubly-robust estimator as well as data-based methods of propensity-score weighting and propensity-score matching. Consistent results across model-based and data-based counterfactual methods confirm the causal conclusions that the effects of the three corporate social capital dimensions on performance are statistically significant and positive. The findings imply that it is the corporate social capital derived from Chinese *guanxi* ties rather than Western-style weak ties that generate productive advantages and boosts the performance of SMEs. Compared to the spurious results in Chapter 4, the conclusions from models in Chapter 5 are causal relations between social capital and performance. To strengthen these causal conclusions,

regression diagnostic techniques (residual and outlier analyses) and minor adjustments were made to models using propensity score matched samples.

Finally, Chapter 6 briefly summarizes the findings presented in Chapters 4 and 5, draws conclusions about the propositions of this study, and provides a discussion of the limitations and possible directions of future research.

Chapter 2 Theories and Propositions

This chapter reviews competing theories in nonrelational and relational perspectives, and it is also used to formulate propositions of how *guanxi*-based corporate social capital promotes business performance in the Chinese context. In particular, three real-world stories learned from in-depth interviews with Chinese entrepreneurs are described to give readers a first impression of how my propositions on *guanxi*-based corporate social capital is related to the performance of SMEs in the Chinese social context. All propositions will be further examined using quantitative data in the following chapters.

2.1 Nonrelational perspective of business performance

The nonrelational perspective of performance treats business organizations as open systems that constantly and rationally adapt to external and impersonal environments (Ashmos & Huber, 1987). Two influential theories in this perspective are transaction cost theory and institutional theory. The left-hand panel of Figure 2–1 organizes these two theories in an ascending order of their theoretical foci on social, cultural, and institutional factors.

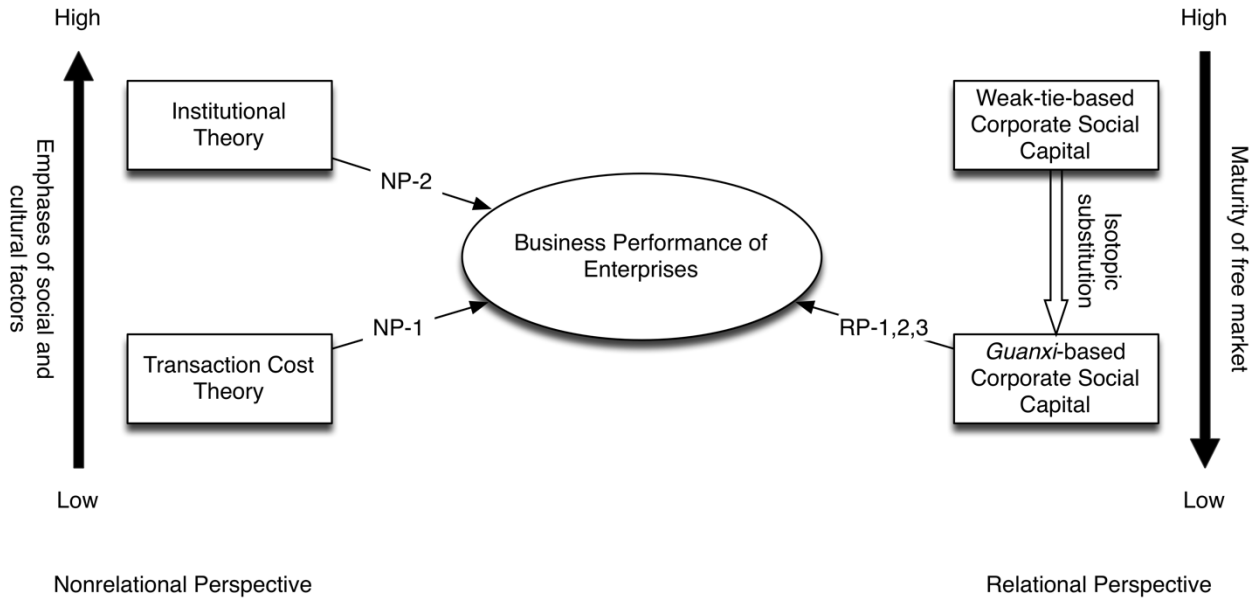

Figure 2–1 Competing theories and propositions in nonrelational and relational perspectives of business performance

Transaction Cost Theory

Performance is a result of lower transaction cost. Transactions are economic exchanges across organizations' technical boundaries. A transaction is free from cost if it is free to obtain transaction-related information, reach mutually acceptable contracts, and control opportunistic behaviors (Dahlman, 1979). In reality, however, market transactions are costly, and some transactions are more costly than others, due to costs of information searching (Smith, Venkatraman, & Dholakia, 1999), repeated bargaining, and "human nature as we know it" (Williamson, 1981). Given great complexity and uncertainty of the modern business environment, costs of searching, contracting, and monitoring complex business activities are considerably high. As a result, better performance comes from effectively controlled transaction costs.

In China all three components of transaction cost tend to be very high. First, timely and accurate market information is largely not accessible to the general public. Even if market information can be obtained, it tends to be less reliable, highly contextual, and usually uncodified. Thus, such market information requires significant amount of manpower, rather than an automatic and computer-based management information system (MIS), to filter and synthesize (Martinsons & Westwood, 1997). Second, due to the lack of timely and accurate market information such as averaged market price for a product, averaged delivery time, and availability of various payment options, it is very challenging to reduce time and financial cost of repeated bargaining before any mutually agreed contracts can be reached. Third, the cost of monitoring opportunistic behaviors is particularly high. China is a low-trust society; universal trust toward general others remains low in China (Fukuyama, 1995). As a result, the perceived risk of opportunism tends to be very high. What makes transactions even more institutionally risky is the fact that in China's less-mature market economy entrepreneurs have to face the lack of enforceable rules and legal regulations that are clear, universal, and fair (Martinsons, 2008). Given these two situations, a high cost of monitoring business transactions can be expected.

For vulnerable SMEs, high transaction cost and impact of opportunistic behaviors are usually not affordable, and it is very unlikely for an individual SME to solve this problem alone. To lower information and contracting cost collectively, grass root trade associations and local governments provide marketing services, including large-scale exhibitions in big cities and small-scale business fairs in local towns. To jointly control opportunism, trade associations and local governments advocate business ethics within industries and improve legal services within local jurisdictions. Effectiveness of these collective solutions, however, varies from enterprise to enterprise. **Nonrelational Proposition 1 (NP-1): Transaction cost explains business performance of Chinese SMEs. SMEs have higher performance if they can effectively control cost of information searching, contracting, and monitoring by utilizing services and regulations of trade associations and local governments.**

Institutional Theory

Performance is a result of institutionalization. Comparing to transaction cost theory, institutional theory focuses more heavily on social, cultural, and institutional factors in its explanations of business performance. Institutional theory incorporates "cultural-cognitive, normative and regulative" (Scott, 2005) factors of social institutions into explanations of performance. Due to different conceptualizations of institutionalization, many institutional theories coexist (Alrich, 2006; Scott, 1987, 2004, 2005). In a review piece, Scott (1987) identifies four definitions of institutionalization: institutionalization as a "process of instilling value" (the institutionalization process attaches meanings and values to organizational interactions), institutionalization as a "process of creating reality" (social realities and social orders are constructed via human interactions), institutionalization as a process of defusing a "shared belief system" (commonly accepted cultures, symbols, and norms explain organizational behaviors), and institutionalization as a process of generating a "distinct societal sphere" (institutionalization attaches different ethics and behavioral expectations to each social sphere). Despite the disagreement in definitions of institutionalization, all institutional theories emphasize that it is the shared rules, norms, as well as social meaning and behavioral habitus that jointly shape organizations' structures and business strategies, which in turn determine business performance.

China's rapid economic reform has been coupled with slow progress in political reform. As a result, communist ideology and the socialist political system are still the most important institutional factors that affect social and economic behaviors in China. In the latest 2004 Constitution of People's Republic of China, it is easy to find Marxist ideology of class society and class struggle. For example, Article I of the Constitution states that "the People's Republic of China is a socialist state under the people's democratic dictatorship led by the working class and based on the alliance of workers and peasants.

The socialist system is the basic system of the People's Republic of China."[5] Combining Marxist doctrines with Chinese realities, a political system of Chinese-style socialism remains the basis of legitimacy on which the Communist Party of China rules political, social, and economic lives in China. To show the critical importance of this political system, following the definition of "socialism with Chinese characteristics," President Hu Jintao's "Speech At A Meeting Commemorating The 90th Anniversary Of The Founding Of The Communist Party Of China (July 1, 2009)" deserves a full quotation:

> The path of socialism with Chinese characteristics is the only way for China to achieve socialist modernization and create decent lives for its people. In taking the path of socialism with Chinese characteristics, we should, under the leadership of the CPC [Communist Party of China] and bearing China's basic national conditions in mind, pursue economic development as the central task, uphold the Four Cardinal Principles[6], be committed to the reform and opening up policy, free and develop the productive forces, strengthen and improve the socialist system, promote the socialist market economy, socialist democracy, an advanced socialist culture, and a harmonious socialist society, and make China a prosperous, strong, democratic, culturally advanced and harmonious modern socialist country.[7]

In such an institutional climate, actively internalizing the mainstream ideology and dominating political system into daily business operations generates the advantage of institutional legitimacy for the existence and development of privately owned businesses. **Nonrelational Proposition 2 (NP-2): Institutional legitimacy explains performance. Chinese SMEs that actively internalize mainstream ideology and political institutions, such as establishing Chinese Communist Party branches (showing support for the party's leadership and the Four Cardinal Principles), unions (showing support for the socialist market economy and the leadership of the**

[5] http://e-chaupak.net/database/chicon/2004/2004.pdf
[6] "Upholding the Four Cardinal Principles" summarizes Deng Xiaoping's speech at a forum on the principles for the Party's theoretical work on March 30, 1979: "1. We must keep to the socialist road. 2. We must uphold the dictatorship of the proletariat. 3. We must uphold the leadership of the Communist Party. 4. We must uphold Marxism-Leninism and Mao Zedong Thought." (http://en.people.cn/dengxp/vol2/text/b1290.html)
[7] Official translation of President Hu Jintao's speech (http://en.people.cn/90001/90776/90785/7426751.html).

working class), and the institution of workers' congress (showing support for the socialist democracy, socialist culture, and harmonious socialist society), obtain higher institutional legitimacy and tend to perform better.

2.2 A relational perspective of business performance*

Continuously rising labor cost and fast improvement of information technologies drastically expanded business organizations of all sizes in industrialized and post industrialized economies since the late 1990s. Scott summarizes this evolution as blurred organizational boundaries, increasing practices of outsourcing, and decentralized power structure. All these new trends, Scott argues, call for "a relational … conception of organizations" (2004, p. 13). Similarly, Hwang (2001) advocates a relational perspective emphasizing "person-in-relations" and "persons-in-relation" as a theoretical paradigm and a methodological foundation for understanding organizational behaviors.

In this research, a relational perspective refers to a theoretical approach that emphasizes the social embeddedness of business behaviors and promotes social capital explanations of business performance. Social capital theories from the relational perspective provide sociological explanations of business activities in which social relations are basic analytical units, and characteristics of social relations are modeled as immediate reasons for economic outcomes. This perspective originates in the idea that economic activities are embedded in concrete social relations and social contexts (Granovetter, 1985), which is theoretically significant for contemporary sociological understanding of economic activities (Emirbayer, 1997).

A major significance of social capital theories of business performance comes from its critiques and improvements of the nonrelational perspective. Transaction cost theory

* This section is a revision of my forthcoming book chapter "*Guanxi*-based Corporate Social Capital and Chinese Entrepreneurship" in Jenn-Hwan Wang (ed.) *Rethinking Social Capital and Entrepreneurship in Greater China*, Routledge.

carries a *Homo economicus* assumption and leads to an under-socialized point of view of organizational behaviors by treating enterprises and entrepreneurs as completely independent from their concrete social connections and meaningful social contexts. While institutional theory, on another extreme, carries an over-socialized point of view and deprives people of their free will and their capability to enact social contexts and alter institutions. A relational perspective emphasizes the power of active social embeddedness and corrects the logical imperfections of under- and over-socialized explanations of business performance.

This section starts with definitions of social capital. It then moves to reviews of productive features of weak-tie-based corporate social capital in Western societies. Finally, I conclude this section with a theoretical decomposition of the concept of social capital, which is used as a logical starting point for my theory building of *guanxi*-based corporate social capital.

2.2.1 Definition and Benefits of Corporate Social Capital

Social capital refers to productive benefits (Coleman, 1988, 1990) derived from structures and resources in networks (Baker, 1990, 2000; Bourdieu, 1986; Burt, 1992; Lin, 2001a, 2001b) composed of durable interpersonal connections (Granovetter, 1985) and membership affiliations (Putnam, 2000). Following the idea of network-embedded economic activities (Granovetter, 1985, 1992; Moran, 2005), in this research I define corporate social capital of SMEs as productive benefits that are derived from entrepreneurs' personal social networks and facilitate business performance. Productive benefits of corporate social capital include (1) information sharing and resource mobilization and (2) trust, shared norms, and commitment.

Information sharing and resource mobilization

Social capital theory predicts that social ties linking a focal entrepreneur to his/her resourceful peers act as "channels or conduits through which 'market stuff' flows" (Podolny, 2001, p. 33). The "market stuff" refers to any business-related information and resource, yet not all social ties are equally effective to channel "market stuff". A widely accepted theoretical prediction is that weak ties connecting heterogeneous network members are more capable of sharing diversified information and resources (Granovetter, 1973). In addition to being channels, weak ties bridging structural holes generate a structural advantage to better synthesize information and control resource flows, which further promotes productivity (Burt, 2005).

Empirical studies in Western societies largely confirm the power of weak ties. First, studies on information sharing show that weak ties provide cost-effective channels for diffusing highly diversified knowledge across organizational borders in both domestic (Bouty, 2000; Walter, Lechner, & Kellermanns, 2007) and international (Presutti, Boari, & Fratocchi, 2007) markets. A recent meta-analysis of 258 research articles on knowledge transfer of small organizations (Macpherson & Holt, 2007) again confirms information benefits of weak ties. Second, weak ties also connect focal entrepreneurs to actors in formal capital markets, such as commercial banks (Uzzi, 1999), venture capital firms and investment banks (Gulati & Higgins, 2003), and seed investors (Shane & Cable, 2002), and to members in informal friendship networks (e.g., Bates, 1997) to extract financial resources. Third, among all weak ties, a special kind of weak ties that bridges network structural holes not only channel more diversified resources (e.g., Burt, 2004; Uzzi & Spiro, 2005) but also provide tie holders with stronger bargaining power, more choices to manipulate resource flows, more effective ways to reinforce strategic alliances, and as a result better business performance (Mizruchi & Glaskiewicz, 1993; Powell, Koput, Smith-Doerr, & Owen-Smith, 1999).

Trust, shared norms, and commitment.

Weak ties not only transfer information and resources but also carry social values, such as trust, norms, and commitment to long-term interactions. These social values gradually attach to social ties via repeated economic interactions and stable membership (Bourdieu, 1986) and lubricate resource flows (Moran, 2005). First, trust attached to social ties secures economic transactions by reducing opportunistic behaviors and unforeseeable uncertainties (Coase, 1937; Williamson, 1981), and trust self-reinforces during repeated interactions (Buskens & Weesie, 2000). As a critical component of social capital (Putnam, 1993, 2000), trust makes social capital an effective governance structure for controlling moral risks and transaction cost (Powell & Smith-Doerr, 1994; Provan & Kenis, 2008; Ring & Van de Ven, 1992).

Next, business norms diffusing across social ties generate solidarity, smooth coordination, and a public good of "value-based business integration" that benefits all network members (Cousins, Handfield, Lawson, & Petersen, 2006). Research demonstrates some important norms diffusing through social networks, such as common goals and mutual interests, community responsibility (Grangsjo & Gummesson, 2006), willingness to collaborate (Rottman, 2008), and moral expectations of acceptable business behaviors (Biggart & Castanias, 2001). Among all norms, social capital particularly emphasizes commitment to long-term and stable social connections among business actors. Strong commitments lower the cost of buyers (Krause, Handfield, & Tyler, 2007), increase the market reputation of suppliers (X. Luo, Griffith, Liu, & Shi, 2004), and foster reciprocity in future transactions (Carney, 2005).

2.2.2 Analytical Dimensions and Isotopes of Social Capital

As reviewed above, findings in Western societies largely confirm that corporate social capital derived from weak ties promotes business performance. This theory is labeled as

"weak-tie-based corporate social capital theory" in this research. Is weak-tie theory the only workable explanation of business performance in the relational perspective? Is establishing weak ties a universally effective solution to exert the productive power of social capital for all kinds of businesses across time and geographic locations?

My answer is "No" because empirical counterexamples have already shown that validity of weak-tie theory is conditional. For example, recent research has already questioned the validity of weak-tie theory by demonstrating the contingent efficiency of weak ties at different developing stages of companies (*timing contingency*) (Maurer & Ebers, 2006), for companies of different ownership and size (*demographic contingency*) (Peng & Luo, 2000), in economies with different levels of marketization (*environmental contingency*) (Batjargal, 2003; Martinsons, 2008), and so on (see Adler & Kwon, 2002 for other contingencies). In addition to these challenges, Confucian traditions of strong-tie preference, personal- and situational-specific moral standards, and the reluctance to take advantage of network members via brokering ties has already been identified as a *cultural contingency* of the weak-tie theory that cannot be ignored (Bian, 1997, 2008; Burt, Hogarth, & Michaud, 2000; Xiao & Tsui, 2007).

Theoretical contingencies lead to an inspiring question: Is weak-tie theory just one special case of all possible social capital theor*ies*? An analytical decomposition of the concept of social capital is the first step to answer this theoretical question.

Social capital "clearly is not a unidimensional concept" (Putnam, 1995, p. 76); this concept contains at least three analytical dimensions: relational dimension, structural dimension, and moral dimension (Nahapiet & Ghoshal, 1998). The relational dimension of social capital comes from the idea of "relational embeddedness" (Granovetter, 1992) and refers to the concrete and ongoing content of social ties, such as levels of "being particular," levels of trust and trustworthiness, and other emotional attachments. Tie strength is a direct measurement of this dimension. Strong relations are so mutually particular that they are more powerful in mobilizing resources and influence and are less likely to decay. In contrast, weak relations are less mutually particular, less irreplaceable,

more likely to decay, but have the power to connect more diversified contacts. The structural dimension of social capital is rooted in the idea of "structural embeddedness" (Granovetter, 1992) and refers to impersonal network structures that can be measured by tie simplexity vs. tie multiplexity. A social tie is simplex if it carries only one function or fulfills only one purpose; a social tie is multiplex if it carries multiple functions (Coleman, 1988; Shipilov & Li, 2014). The origin of the moral dimension of social capital can be traced back to Bourdieu's observation on the durable obligations of network members that entitle them to credit "the collectivity-owned capital" (1986, p. 249). The variation in feeling obliged to provide resources to network members is a direct measure of this dimension. Some networks have stronger culture of reciprocity and members in such networks are subjected to a socially coercive power to be reciprocal. Other networks do not carry such a culture; reciprocal behaviors in these networks are largely optional and usually based on rational calculations of investments vs. gains.

Different combinations of these three dimensions generate social capitals based on different network configurations (Nahapiet & Ghoshal, 1998) and bring different benefits. In this research I push this idea one step further to define isotopes of social capital in the following way:

> Social capitals with *different* dimensional configurations are *isotopes* of each other if they fulfill the *same* set of functions.

Theories relating *isotopic* social capitals to a given outcome are competing social capital theories in the relational perspective. These theories share one identical proposition: social networks are productive. These theories differ in predictions of "which social networks are more productive in what context." For example, weak-tie-based corporate social capital has a configuration of low particularism, simplexity, and low obligations, and weak-tie theory explains the business performance of some enterprises in Western societies. In China's cultural context, *guanxi*-based corporate social capital has a configuration of high particularism, multiplexity, and strong obligations, and it fulfills the same business functions in China as weak ties do in the West.

Therefore *guanxi*-based corporate social capital and weak-tie-based corporate social capital are isotopes, and a theory of how *guanxi* facilitates business performance in China competes directly with weak-tie theory. In the second half of this chapter, I will elaborate a theoretical framework to show how *guanxi*-based corporate social capital acts as an isotope of weak-tie-based corporate social capital in a Chinese context by using interview stories as supportive materials.

2.3 *Guanxi*-based Corporate Social Capital

This section elaborates a theoretical framework containing three propositions to show how *guanxi*-based corporate social capital (lower-right panel of Figure 2–1) acts as an *isotope* of weak-tie-based corporate social capital in the Chinese context. When articulating propositions, I include three interview stories as supportive materials to show how each dimension of *guanxi*-based corporate social capital promotes performance.

2.3.1 A Social-Network Definition of Chinese *Guanxi*

The term "*guanxi*" is a cultural concept that is commonly used in Chinese everyday language; its meaning is similar to "relationships" or "connections" in English.[8] However, the exact meaning of *guanxi* cannot "adequately be expressed by an English-language equivalent of one word, the concept is too culture specific" (Parnell, 2005, p. 35). To incorporate this cultural concept into the discourse of social capital theories, a *guanxi* tie is defined as a particular instrumental tie (Hwang, 1987, 2001; Walder, 1986;

[8] In the Chinese grammatical system there is no difference between plural and singular forms of a countable noun. As a countable noun, *guanxi* can refer to "a connection" or "a set of connections" depending on context. This linguistic difference between Chinese and English further increases the difficulty of translation. In this chapter I use "a *guanxi* tie" to refer to "one/a connection" or "one/a tie" and "*guanxi*" as a *plurale tantum* noun that refers to "connections" or "ties."

Yang, 1994) or "a dyadic, particular and sentimental tie that has potential of facilitating favor exchanges between the parties connected by the tie" (Bian, 2006, p. 312).

Several key words in Bian's definition of *guanxi* deserve a closer look. First, *guanxi* ties in either situation are "mutually special and beneficial for both parties" (Bian & Zhang, 2014, p. 424). In China, strong ties among family members and relatives are culturally defined as particular ties. In addition, nonkin weak ties also have the potential to become strong pseudokin ties if both parties decide to conduct frequent and long-term interactions, during which kinlike sentiments accumulate. Next, various interpersonal sentiments are crucial components of *guanxi*, such as personal face (*mianzi*), personal feeling (*renqing*), and personal attachment (*ganqing*) (Hwang, 1987; Kipnis, 1997; Lee & Dawes, 2005). The accumulation of those sentiments continuously increases the level of "being particular" over time.

Lastly, *guanxi* ties are used to channel favors, which refers to "substantial help that produces decisive outcome or influence on others to get things done" (Bian & Zhang, 2014, p. 425). In Chinese culture, favors are an extremely valuable resource that can be exchanged exclusively through *guanxi* ties in a reciprocal manner. In this research, favors observed in interviews include interest-free borrowing, insider-only market information and business opportunities, exclusive technical know-hows, franchised marketing channels, highly discounted logistic services, and government purchases. In addition to resource diversity, favor exchanges are also reciprocal by nature—favor receivers carry their moral obligations and psychological pressure to repay favor granters, and granters expect obligated favor paybacks from receivers in the future (A. Y. King, 1985, 1994).

2.3.2 *Guanxi*-based Corporate Social Capital: Theory and Propositions

I define *guanxi*-based corporate social capital as productive benefits derived from entrepreneurs' *guanxi* ties that facilitate business performance. As an isotope of weak-tie corporate social capital, *guanxi*-based corporate social capital fulfills functions of

information/resource sharing and moral value injections in China. Empirical studies show that Chinese *guanxi*-based corporate social capital acts as conduits of information and resource flows (Parnell, 2005), which are crucial to business performance (Y. Luo & Chen, 1997). At the same time, *guanxi*-based corporate social capital promotes trust among kin and pseudokin network members, defuses shared norms of proper behaviors, and generates commitment to long-term reciprocal obligations (Bu, 2003; Cheng, 1995; Li & Liang, 2002; Wang & Liu, 2002). Empirical studies also show that these productive benefits cannot be effectively fulfilled by Western-style weak-tie-based corporate capital (Carlisle & Flynn, 2005; Standifird & Marshall, 2000).

Particularism

High particularism differentiates *guanxi*-based corporate social capital from weak-tie-based corporate social capital in the relational dimension of social capital. *Guanxi* ties meet the definition of ties that are strong in "emotional intensity, the intimacy (mutual confiding), and the reciprocal services" (Granovetter, 1973, p. 1361). But the term "strong tie" cannot fully capture the particular nature of *guanxi* ties because *guanxi* is more complicated in its social meanings and much richer in functions than Westerners' understanding of strong ties.

First, *guanxi* ties are strong ties connecting egos to diversified network members and resources. In Western societies, the term "strong ties" refers to kinship ties among family members and relatives. As a result, the attributes of network members tend to be homophilous. *Guanxi* ties are strong but contain not only relatives but also a large number of pseudokin members. Pseudokin is a unique aspect in China, which is theorized as the "differential mode of association" (*cha xu ge ju*) (Fei, 1992). *Guanxi* represents a special type of strong ties that gradually emerge from actively attaching kinlike sentiment, intimacy, and various moral expectations to nonblood relationships so that social distance between two parties can be significantly shortened. In China pseudokin

ties usually include ties among classmates (people socialized together in the same environment from childhood to early adulthood), *laoxiang* (people born and/or raised up in the same geographic area and share the same cultural identities and collective memories), comrades-in-army (people who share the same collective memories of harsh conditions or even life-or-death experiences), and patron-client relationships in the workplace (traditional Confucian ideology expects the leader-subordinate or teacher-student relation to follow similar moral standards that govern father-son and king-subject relations). The exclusive nature of favors requires a certain level of particularism as a precondition of initiating exchanges. *Guanxi* network has a tendency to continuously transform more and more heterogeneous network members into pseudokin members so that the exchanging insider-only favors for diversified needs can be achieved. As a result, the process of "pseudokinization" that enables subsequent flows of favors eventually leads to an expanding inner circle of one's *guanxi* network to include resourcefully diversified contacts. In this sense, the Western definition of "strong tie" only captures ties between relatives in a *guanxi* network and ignores pseudokin ties.

Second, *guanxi* generates person-specific moral standards. The differential mode of association, as a value system, prevents Chinese from establishing a universal moral standard (especially general trust) that is applicable to general others. Instead, Chinese people have different norms to treat people of different social distances, whose slight and subtle difference is very important for Chinese people to follow different moral standards. For example, taking advantage of core network members cannot be tolerated and will result in severe social sanctions, while playing opportunistic tricks on network outsiders is sometimes perceived as a clever move for the collective interests of insiders. As a result, higher levels of particularism in China lead to stronger person-specific trust and trustworthiness, which can later be used to facilitate business transactions. At the same time, the lack of particularism brings higher moral risks in business transactions and harms performance.

The particularism of *guanxi* demonstrates the power of strong ties in China. This feature of *guanxi* ties contradicts the theoretical predictions of weak ties (Burt, 2005; Granovetter, 1973). The ultimate reason for disagreement of this pair of competing theories is the resource exchangeability. The power of weak ties is a true prediction only when resources are exchangeable across network boundaries. If this precondition is not true, strong ties will become the only solution for mobilizing insider-only resources. Take information as an example. In the West, codified information can be transferred through strong and weak ties. Compared to strong-tie contacts in western contexts, weak-tie contacts are more heterogeneous and therefore are more capable of providing diversified information. This is the power of weak-ties. In contrast, codified and reliable information is very rare in China's public domain (Martinsons, 2008). Instead, high-quality information that is timely, reliable, and accurate is isolated in inner circles of networks, and circulations of such productive information is considered as favor exchanges, which can only be achieved via *guanxi* ties.

Relational Proposition 1 (RP-1): In China, high level of particularism facilitates business performance because such relational advantage provides *guanxi* network insiders with (1) the capability of mobilizing members-only favors of high-quality resources and information that can substantially fulfill diversified instrumental needs; (2) a high level of trust and trustworthiness guaranteed by kinlike sentiment in *guanxi* ties.

Story of Mr. Wu

Mr. Wu, a forty-seven-year old in 2002, was previously a farmer in the rural outskirts of town D. He had only a primary school education. In 1982 he established a small furniture workshop in his hometown D. Although Mr. Wu grew up in a rural area, he had a strong global vision even at the early stages of his business. After twenty years of promoting traditional Chinese rosewood furniture overseas, Mr. Wu's company expanded from a tiny backyard workshop to a 20,000 square-meter R&D and manufacturing compound with more than 500 employees. By 2002 Mr. Wu's company had become the leading competitor in the local rosewood furniture industry in town D. With over 180 different designs in five production lines, Mr. Wu earned an outstanding

reputation in the overseas luxury furniture markets in the United States, Singapore, Malaysia, Hong Kong, Macau, and Taiwan.

In 1982 when opening and reforming policies took effect in town D, Mr. Wu decided to start his own business. At that time the initial funds of around four thousand RMB Yuan represented a huge amount of money for an ordinary rural family. Almost all of his initial investments came from his brothers and sisters, particularly his close relatives in Hong Kong who had enough money to invest and strong incentive to help relatives who were fighting against poverty. The money Mr. Wu obtained from relatives in Hong Kong carried no interest and there was no repayment date. Both Mr. Wu and his relatives in Hong Kong treated the investment funds as family support with strong kinship sentiment rather than a for-profit investment.

In addition to these initial investments, *guanxi* with relatives and close friends in town D also provided Mr. Wu with skilled labor. In the early stages of Mr. Wu's business, none of the workers had experience in organizing and running a small family-owned furniture workshop. A strong feeling of belonging and a shared vision to significantly improve family living standards generated a persistently high level of work incentives. In this learning-by-doing stage, the workers in Mr. Wu's small factory worked like a family and eventually overcame difficulties in product design, manufacturing, and marketing.

Years later, some of these founding members left Wu's company and started their own businesses in various industries. Starting their own businesses did not cut their strong ties with Mr. Wu. Instead, these founding members became crucial in the later developmental stages of Mr. Wu's company. First, these strong ties guaranteed frequent face-to-face communication, which provided Mr. Wu with up-to-date, diversified, and trustworthy insider-only information about good ideas for production designs, latest market demands, new business orders, and so on. Second, during the expansion of their own businesses these founding members also established new network ties and then bridged Mr. Wu to their new friends with more diversified resources. At one point Mr. Wu faced an unexpected shortage of diesel fuel for his machines and did not have enough cash to buy fuel from the market. One of the founding members knew of Wu's difficulty and quickly introduced Wu to a factory owner in his new network who happened to have some extra diesel fuel reserves. Mr. Wu immediately signed a borrowing contract with this new friend and agreed to repay the same amount of diesel fuel in a few months at no interest. Finally, when the founding members successfully expanded their own businesses, they were more capable of providing more frequent and stronger financial support to Mr. Wu. It was a constant challenge for luxury rosewood furniture companies to maintain enough cash flow, but the interest rate of short-term

loans from commercial banks tended to be very high. It was therefore very common for Mr. Wu to borrow money from strong-tie network members for an interval of several months to buy raw materials, pay wages, and cover other related expenses before receiving payments from his customers. Such short-term borrowing was treated as a favor exchange since strong-tie network members have the obligation to help one another. Usually these short-term loans carried no or a very low interest rate due to the high level of pseudokin sentiment.

Tie multiplexity

Multiplexed ties, or "multi-stranded ties," were first studied by anthropologists (e.g., Mitchell, 1969; Verbrugge, 1979) and defined as "the overlap of roles, exchanges, or affiliations in a social relationship." (Verbrugge, 1979, p. 1286) Among social network analysts, Coleman's (1988) term of "appropriability" (social ties of one kind can be used to achieve other purposes), Hwang's concept of "mixed tie" (1987) and a more recent study on multiplexity (Shipilov & Li, 2014) demonstrate how this phenomenon can be integrated into social capital theories.

Guanxi ties tend to be multiplexed. A *guanxi* tie usually fulfills diversified functions that "mix qualitatively different norms of exchange, namely expressive with instrumental, social with economic, symbolic with material, personal with public, friendship with businesslike, [and] familial with collegial"[9] (Bian & Zhang, 2014, p. 427). First, tie multiplexity increases functional diversity for a given network size and represents a more efficient way to excavate network resources. Since *guanxi* ties are very costly and time-consuming to establish and maintain, multiplexity therefore becomes critically important in mobilizing diversified resources with a limited number of core *guanxi* network members. Next, when a tie is multiplexed by both instrumental and emotional functions, trust and trustworthiness start to accumulate on that tie. The multiplexity nature of *guanxi*

[9] This multiplexity nature of *guanxi* provides a theoretical explanation of the social phenomenon that Chinese people often cannot clarify the different norms of exchanges across social domains when they are connected by *guanxi*, as widely observed by China researchers (Gold, Guthrie, & Wank, 2002; Kipnis, 1997; Smart, 1993; Yan, 1996; Yang, 1994).

ties explains why Chinese entrepreneurs often conduct business with kin and pseudokin members in their networks, and actively attach emotional functions to important business relationships (Wong, 1988). Finally, compared to people linked by simplex ties, "people in a multi-stranded relationship interact with one another in many different contexts and are therefore less likely to be able to withdraw completely from contact with one another" (Mitchell, 1969, p. 23). That is, multiplexity provides an additional safeguard against tie decay.

Multiplexity has the following two implications for how *guanxi*-based corporate social capital matters to the performance of Chinese SMEs. First, multiplexed *guanxi* ties carry instrumental interests and emotional values at the same time, which increases the social cost of opportunist behaviors (people usually cannot handle the price of cheating a business partner who is also a close relative or pseudokin) so that multiplexity effectively controls transaction cost. Second, the enduring nature of multiplexed ties increases the stability of long-term business relationships. Combining these two implications **Relational Proposition 2 (RP-2) predicts that in China highly multiplexed ties generate structural advantages to control opportunistic behaviors and secure long-term and stable business relations, all of which facilitate performance.**

Story of Mr. Xue

Mr. Xue, forty years old in 2002, was a junior high school graduate. He established his furniture company in the early 1980s in town D. By the end of 2002 his company provided at least 200 jobs locally and reached an after-tax profit of 4.7 million RMB Yuan. As a very profitable business specializing in designing and selling high-end rosewood furniture in the domestic luxury furniture market, his company earned a good reputation as a top-ten brand in the local furniture industry of town D.

Guanxi provided the initial investments for Mr. Xue's business. Besides personal savings, Mr. Xue managed to obtain additional starting investments mainly from relatives and close friends. Only a small proportion of investment came from local bank loans. It was not easy to obtain financial support from state-owned banks in the early 1980s. The interest rate was very high, and the amount of loan was limited—around 2000 RMB Yuan. Local banks also required reliable

guarantors as a nonnegotiable precondition to endorse the private borrower's creditworthiness. To meet this precondition, Mr. Xue depended heavily on close friends and relatives in his village who had known him for a long time, trusted him, and were willing to take unpredictable risks.

After Mr. Xue's business entered a stage of rapid expansion, informal financial support from family members, relatives, and close friends could no longer sustain the needs of constant cash flow and larger amount of hardware investment. Formal and institutionalized sources of financial supports from banks and credit unions then became crucial for the development of Mr. Xue's company. However, informal social connections still played an important role in obtaining loans more quickly and cheaply. Mr. Xue mentioned Brother[10] San (*San ge*) repeatedly during our face-to-face interview as a crucial figure who bridged Mr. Xue to highly competitive commercial loan offers. Brother San had a strong tie with the local branch manager of state-owned Bank A. By mobilizing this tie, Mr. Xue obtained low-interest loans from Bank A with a much-simplified and quicker loan-approval process. This special *guanxi* with Brother San, Mr. Xue admitted, was the first key advantage for his business success.

In addition to providing loan offers, Brother San also channeled the latest governmental policies and government purchasing opportunities to Mr. Xue. Brother San had close friends who worked for the local government, and some of his friends were officials who were decision makers for local commercial policies and governmental purchases. Mr. Xue and Brother San met frequently, and during their casual conversations insider-only information flowed naturally from Brother San to Xue. More importantly, the help of Brother San and his friends in the local government were not limited to information sharing. Substantial favor exchanges could lead to highly profitable business. For example, as a governmental support of the development of the local private economy, local policy loans were usually much cheaper and their payment terms were much longer than commercial loans. However, not all private companies in the local market had equal opportunity to be financed by this policy. Help from the inside bridged by Brother San became a competitive advantage for Mr. Xue.

[10] In Chinese culture "brotherhood" represents a typical pseudokin *guanxi*. San and Mr. X were not relatives, but strong interpersonal sentiment and emotional functions were later attached to their instrumental relations.

Obligations

Feeling obliged to do something that is culturally proper to do contrasts *guanxi*-based corporate social capital with weak-tie-based corporate social capital in the moral dimension. Strong obligations among *guanxi* network members are culturally constructed and are deeply rooted in Confucian traditions. The core idea of moral obligations is that when interacting with *guanxi* network insiders, doing things that are morally "proper" always takes priority over doing things that are rationally "correct." An extreme example is provided in the moral teaching of Confucius: "The Duke of She informed Confucius, saying, 'Among us here there are those who may be styled upright in their conduct. If their father has stolen a sheep, they will bear witness to the fact.' Confucius said, 'Among us, in our part of the country, those who are upright are different from this. The father conceals the misconduct of the son, and the son conceals the misconduct of the father. Uprightness is to be found in this.'"[11]

In this story, rather than following the legal duty of a citizen (and also a rational calculation to avoid severe punishment for concealing the truth) to report crimes honestly to officials, it is the moral obligation of the son to conceal the crime of his father. Rational calculation is clearly not part of the son's decision-making process. Of course, this is an extreme case of practicing moral obligation. In daily business activities, practicing moral obligations is usually observed as prioritizing the interests of *guanxi* partners over selfish rational calculations. In another words, moral obligations include a set of culturally defined and mutually expected norms to provide reciprocal and unselfish favors to other *guanxi* network insiders. Following such moral standards also broadcasts the good reputation of helpers across the *guanxi* network and credits helpers with a moral advantage to receive larger favors in the future. Therefore, **Relational Proposition 3 (RP-3): In China, culturally defined and socially coercive moral obligations provide**

[11] Translated by James Legge (http://ctext.org/analects/zi-lu).

entrepreneurs with safety nets against unpredictable market fluctuations and ensure continuous favor exchanges in the future, all of which improve performance.

Story of Mr. Yang

Focusing mainly on lower-end furniture markets, Mr. Yang's company in town D was a small and young business established in 2001. By the end of 2002 around sixty full-time employees worked for Mr. Yang's business, assembling cheap wooden furniture. The majority of his business orders came from domestic markets.

Compared to Mr. Wu and Mr. Xue, Mr. Yang had more experience in running a private business before he established his current factory in town D. Thirty-six years old in 2002 with a junior high school education, Mr. Yang was one of the earliest to leave his hometown in Zhejiang Province to take advantage of market reform in southeast China beginning in the early 1980s. Mobilizing *guanxi* with local administrative officials, Mr. Yang began in self-employment in Shenzhen as an agent for Chung Ying Street Closed Area Entry Permits. Years later, one of his weak-tie friends invited him to join in starting a furniture factory in Zhuhai, but this business soon ran into trouble due to serious wage disputes between his friend and the workers. When Mr. Yang was facing huge pressure and deciding to quit, one of his *laoxiang* in his inner *guanxi* circle, Mr. Kang, provided him with a huge favor. Mr. Kang first helped Mr. Yang establish a rosewood-painting workshop in town D, then started to outsource painting and finishing projects from his furniture company to Mr. Yang. To help Mr. Yang out in those years, Mr. Kang continued to pay him outsourcing prices higher than the market average. Gradually Mr. Yang not only fully recovered from his investment failure in Zhuhai but also accumulated enough money to open a new rosewood furniture showroom in town D in the early 1990s. In the late 1990s the profit margin of running a showroom declined dramatically, and Mr. Yang decided to begin his own furniture manufacturing business in 2001.

Switching his business focus from the furniture retailing industry to furniture manufacturing was a difficult transition, but Mr. Yang was very lucky. He maintained a dense *laoxiang* network in town D (members in this network were all from Zhejiang Province and worked in town D), and this network advantage bridged him to the needed human capital and technical know-how. Several *laoxiang* in his *guanxi* network were highly experienced carpenters with high salaries and widespread reputations in town D. They were the first group of helpers willing to quit their current jobs and switch to Yang's newly established company. Quitting jobs from fully established companies to join Mr. Yang's new venture was not a very rational choice—they faced the

possibility of lower wages and higher risk, but "as *laoxiang*, we are obliged to help each other out." After Mr. Yang's new business started to grow, he began to hire more and more *laoxiang* in town D or from his hometown a thousand miles away. "Most of the skilled workers, all R&D, and all managerial staff are my *laoxiang*. We speak the same language. We have similar taste in designing. We trust each other and work together like a family. Besides, we always feel mutually supported since *laoxiang* are supposed to help each other out."

Table 2–1 summarizes the theoretical innovation of isotopic social capitals. *Guanxi*-based corporate social capital elaborated in this chapter is theorized as an isotope of weak-tie corporate social capital. *Guanxi*-based social capital has a high level of particularism among *guanxi* network members. Each *guanxi* tie is highly personalized, mutually particular, and multiplexed. Players connected by *guanxi* have to follow culturally defined moral obligations of providing favors to help each other in a reciprocal manner. Grey cells in Table 2–1 show that *guanxi*-based corporate social capital is an isotope of weak-tie-based corporate social capital – they fulfill the same productive functions but their internal analytical dimensions take opposite values (high in three dimensions vs. low in these dimensions). Besides these two extremes, we cannot rule out two additional possible social capital isotopes derived from associational/elite networks and ethnic networks. I suggest that future social capital studies pay more attention to these isotopes to further enrich relational explanations of business performance.

In the following chapters the propositions are operationalized into testable hypotheses, and quantitative survey data is used to examine the relative merits of these hypotheses.

Table 2–1 Three dimensions of corporate social capital and examples

Tie Multiplexity	Relational Particularism	
	High	Low
High	Extremely strong obligation *Guanxi* networks Old-boy networks	Moderate obligation Associational/Elite networks
Low	Strong obligation Ethnic networks	Weak obligation Weak-tie networks Structural-hole networks

(Source: Bian and Zhang 2014:428)

Chapter 3 Data, Measurement, and Analytic Strategy

3.1 Data

Competing theories of business performance will be tested using a survey data of eight hundred and thirty SMEs. This questionnaire survey was carried out in 2003 to investigate how social capital stimulates entrepreneurship and facilitates development of nascent businesses in three industrial cities of the Pearl River Delta (PRD): Foshan (435 cases), Zhongshan (206 cases), and Jiangmen (189 cases) (Figure 3–1 illustrates geographical distribution of samples). This survey was a joint research project between the Division of Social Science in Hong Kong University of Science and Technology and the Research Institute for Guangdong Development in Sun Yat-Sen University (Bian, 2008). Among valid cases, fourteen collectively owned SMEs established long before 1978 will be excluded from further analyses and the remaining analytical sample size is 816.

(Source: www.pland.gov.hk)

Figure 3–1 Map of the Pearl River Delta (PRD) and sample size distribution in cities of Foshan, Zhongshan, and Jiangmen

PRD region is the economic center of Southeastern China. This region covers nine densely populated prefecture-level cities surrounding the Pearl River Estuary, namely Guangzhou, Shenzhen, Dongguan, Foshan, Zhongshan, Jiangmen, Zhuhai, Zhaoqing, and Huizhou. PRD has been a powerful engine of China's economic growth for more than three decades since 1978. Fueled by continuing foreign investments, PRD drastically transformed itself from a poor rural region into the world's factory. Taking the momentum of China's accession to the World Trade Organization in 2001, booming local entrepreneurship, and export-oriented economic policies, PRD achieved a developmental miracle. Behind this economic miracle, a large number of young private businesses makes PRD an ideal location to study performance of Chinese SMEs.

In nine cities of PRD, Foshan, Zhongshan, and Jiangmen were selected to conduct this questionnaire survey because of following three reasons. First, young private SMEs are highly concentrated in these three cities. Four cities to the northeast of PRD (Guangzhou, Shenzhen, Dongguan, and Huizhou) and Zhuhai city to the south of PRD are geographically adjacent to Hong Kong and Macau. As a result, these five cities have long been dominated by Foreign Direct Investments (FDI) since 1978. On the contrary, cities of Foshan, Zhongshan, and Jiangmen locate relatively far from Hong Kong and Macau and were less impacted by foreign capitals. As a result, they started their economic development much later and utilized less FDI. It is in those three cities can we easily locate nascent and locally-funded private businesses.

Next, local private SMEs are industrially clustered in these three cities. Analytical sample of 816 SMEs belong to six labor-intensive industries: textile/dyeing/finishing, metal processing, fashion and garment, ceramics, furniture, and building materials. This clustering feature makes it easy to control industrial difference (Bian, 2008, p. 176). These six industries in China have long been labor-intensive industries, which make it very reasonable to use total employees, fixed assets, and value-added tax (VAT) to measure business performance.

Last but not least, the collaborating institution of this survey, Sun Yat-Sen University, has long been conducting academic research in Foshan, Zhongshan, and Jiangmen "and the prior knowledge about the industrial structure and social situations about these cities was immediately available to design and implement the survey there" (Bian, 2008, p. 176). Carefully selected interviewers who were familiar with local businesses carried out this survey during fall and winter of 2003 and yielded a response rate of 70%.

This survey data is a representative sample. "The distribution of size of survey factories is comparable to that of the population" (Bian, 2008, p. 177). This survey data is also high in validity. Around 84.3% of valid questionnaires (701 out of 830) were answered in-person by business founders and general managers of selected SMEs and 15.7% of questionnaires (129 out of 830) had to be finished by people in top managerial positions who had deep knowledge of their enterprises.

Comparing to other surveys on the same topic, this study as a unique feature – measuring social networks of entrepreneurs by using name-generator, a standard device used by social network analysts to measure the networks of interpersonal connections around the world (Marsden, 1987). Rather than capturing time and money spent on building and maintaining *guanxi*, this survey collects social network data directly. All three *guanxi*-based corporate social capital dimensions can be derived from the name-generator. This unique feature is another important reason why I chose this data to examine propositions proposed in Chapter 2.

3.2 Measurement

3.2.1 Performance

Business performance is a multi-facet concept. In this study, three indicators capturing scale and revenue are suitable measures of SMEs' performance in labor-intensive industries: total number of employees, fixed assets, and value-added tax (VAT). These

indicators are highly correlated. As a result, a factor analysis is conducted to generate a performance index as a single continuous measure of business performance.

Total number of employees is a direct measure of business scale. In this study, this measure captures numbers of manual labors working for a given SME at the end of 2002. In my factor analysis, the natural logarithm of this measure will be used. Table 3–1 shows that in the analytic sample, the average of total employees is 63 (its natural logarithm is 4.145). Fixed asset is another measure of business scale. To minimize the impact of missing data and increase measurement reliability, this study takes average of fixed assets (in unit of 10,000 Yuan) across three consecutive years of 2000, 2001, and 2002. If respondents provide valid answers to fixed asset of all three years, the average is the sum of three observations over 3. If there is any one missing observation across three years, then the average value is the mean of two available records. If there is only one available observation, then that valid value is used directly. The average is later transformed into its natural logarithm for factor analysis. The analytic sample shows an averaged fixed asset of 1.2 million RMB (natural logarithm is 4.767). VAT (in unit of 1,000 Yuan) is a measure of business revenue. For SMEs in this study, SMEs with higher taxable sales income pay higher VAT. An averaged VAT is generated from three yearly observations from 2000 to 2002. The analytic sample shows an averaged VAT of 13,900 RMB (natural logarithm is 2.631).

Table 3–1 Descriptive statistics for observed and factor measurements of corporate performance

	Mean	S.D.	Min	Max	Factor loading
Performance Index	0.000	0.919	-2.209	2.920	
Ln(total employees in 2002)	4.145	1.284	0.693	8.006	0.754
Ln(avg. fixed assets, 2000-2002)	4.767	1.780	-0.149	9.916	0.852
Ln(avg. VAT, 2000-2002)	2.631	1.770	-3.117	7.869	0.858

N = 623; Alpha reliability coef. = 0.8626

Table 3–2 Correlation coefficients and list-wise sample sizes of performance measurements

	(1)	(2)	(3)
(1) Ln(Total employees)	1.0000		
	(810)		
(2) Ln(Averaged fixed assets)	0.6684	1.0000	
	(683)	(685)	
(3) Ln(Averaged VAT)	0.7001	0.7857	1.0000
	(701)	(625)	(705)

* All correlation coefficients are significant at p<0.001 level; sample size in parentheses.

Three indicators of business performance are highly correlated (and their correlation coefficients are statistically significant at the p<0.001 level as summarized in Table 3–2), which makes it statistically possible to conduct a factor analysis and generate a single continuous measure of performance. A principal factor analysis (see factor loadings in the last column of Table 3–1) with 623 cases that have no missing value on any of three indicators generates a single performance factor. This factor has a mean of zero and higher value in this performance index represents better performance. The alpha reliability of this performance factor reaches 0.8626.

3.2.2 Measures of nonrelational explanations

Transaction cost

The transaction cost proposition predicts that SMEs have a higher performance level if they effectively control the costs of information searching, contracting, and monitoring by using services and regulations of local trade associations and local governments as well as by building up trust with business partners. To have an overall level of transaction cost, a principle factor is extracted from following five indicators.

First four indicators are subjective evaluations of the effectiveness (1=not useful at all, …, 3=so-so, …, 5=very useful) of following activities in reducing transaction cost: (1) government's legal regulations of market transactions and marketing services (exhibitions or fairs) (this indicator has a mean of 3.993 and a standard deviation of 0.715); (2) marketing services provided by local trade associations (mean of 3.454 and standard deviation of 0.822); (3) information of business opportunities and new

technologies advertised by local trade associations (mean of 3.516 and standard deviation of 0.796); and (4) consensus on proper business ethics advocated by local trade associations (mean of 3.199 and standard deviation of 0.816). The fifth indicator of transaction cost is a subjective evaluation of trust. Each respondent provides subjective evaluations of trust (1=no trust at all, …, 4=so-so, …, 7=strong trust) on his/her three most important business partners. Average of these three answers[12] (the average is 5.440 with a standard deviation of 0.821) is then used in factor analysis. A principle factor analysis extracts a single continuous measure of transaction cost from these five indicators. The factor score of transaction cost has a mean of zero and ranges from negative three to positive two. Higher factor scores represent lower transaction cost and lower factor scores denote higher transaction cost. To save sample size, missing values in indicators are imputed by their own mean values (shown in Table 3–3) before factor analysis. A dummy variable showing status of imputations (1=at least one indicator is imputed; 0=no imputation) will be included as a control variable in regression models to further isolate possible impacts due to this imputation.

With overall transaction cost measured by this factor score, NP-1 is operationalized into the **nonrelational hypothesis 1 (NH-1): higher values in the transaction cost factor imply lower transaction costs, which leads to higher values in performance index.**

Institutional legitimacy

Institutional legitimacy predicts that SMEs actively internalizing mainstream ideology and political institutions, such as establishing branch of Communist Party of China (CPC), union, and workers' congress, tend to perform better. Three institutions in this proposition are measured directly by three yes/no questions: in your enterprise, do you have (Have=1; Don't have=0): (1) CPC branch; (2) union; and (3) workers' congress?

[12] If a respondent provides subjective evaluations of trust to two business partners, then the average is defined as the sum of two evaluations over two.

Valid cases show that on average7.3% of SMEs have active CPC branches, 24.7% have unions, and 32.3% adopt the institution of worker's congress. An overall measure of levels of institutional legitimacy is a sum of these three dummy indicators. The sum, ranging from zero to three, is treated as a continuous variable of institutional legitimacy[13] in following models. On average, this institutional legitimacy measure has a mean of 0.638 and a standard deviation of 0.867 (see descriptive statistics in Table 3–3). Higher values in this measure represent higher levels of legitimacy. With institutional explanation operationalized in this way, **nonrelational hypothesis 2 (NH-2) predicts that SMEs with higher values in the institutional legitimacy measure will have higher values in performance index.**

Table 3–3 Descriptive statistics of observed and factor measures for nonrelational theories of business performance

Nonrelational Measures	N	Mean	S.D.	Min	Max
Transaction Cost (Principle factor score)	816	0.000	0.665	-3.140	2.000
Gov's market regulations/service this useful	731	3.993	0.715	1	5
Market service of trade associations is useful	599	3.454	0.822	1	5
Information service of trade associations is useful	605	3.516	0.796	1	5
Governing and regulations of trade associations is useful	573	3.199	0.816	1	5
Trust with 3 VIPs	797	5.440	0.821	1.688	7.000
Institutional Legitimacy (Sum of dummy indicators)	816	0.638	0.867	0	3
Branch of CPC (Have=1; Don't have=0)	810	0.073	----	0	1
Union (Have=1; Don't have=0)	814	0.247	----	0	1
Worker's congress (Have=1; Don't have=0)	807	0.323	----	0	1

3.2.3 Measures of relational explanations

Particularism

In Chinese culture, five kinds of social relations with strong interpersonal sentiments are prevailingly perceived as "being particular" – kin/relative, classmate/schoolmate, comrade-in-army (people serving in the same military unit together), *laoxiang* (people sharing the same birthplace, dialects, and local culture), and brother-like friends (similar

[13] To save sample size, missing values on each of those three indicators are imputed with "0 (no)" before summing them up.

to the concept of brotherhood in the West). A business relation is considered to be particular if both parties of this relation are connected by at least one of these five types of ties. A business relation is higher in the level of particularism if it can be classified into more than one of these five sentiment-rich relations.

A name generator identifies these particular relations in entrepreneurs' social ties with their most important three business partners. Following five yes/no questions (Yes=1; No=0) were asked repeatedly with regard to three nominated business partners (k=1, 2, 3):

The *k*th business partner is my kin/relative (denoted as P_{k1} in Equation 3–1);
The *k*th business partner is my former class/schoolmates (P_{k2});
The *k*th business partner is my former comrade-in-army (P_{k3});
The *k*th business partner is my *laoxiang* (P_{k4});
The *k*th business partner is my brother-like friends (P_{k5}).

Equation 3–1 generates a continuous variable as the measure of overall particularism[14]. Since some business partners are more important than others, proportions of the total 2002 annual sales due to businesses with the *k*th most important partner, w_k, is included in this calculation as a weighting factor. Higher values in the measure denote stronger particularism.

$$Particularim = \sum_{k=1}^{3}\left(w_k \sum_{i=1}^{5} P_{ki}\right) \qquad \textbf{Equation 3–1}$$

$$= w_1(P_{11} + P_{12} + \cdots + P_{15}) + \cdots$$
$$+ w_3(P_{31} + P_{32} + \cdots + P_{35})$$

[14] Missing values of particularism are imputed with its mean value. For each case, a dummy variable denoting status of imputation is generated. It will be coded as "1" if the particularism measure is imputed, otherwise it will be coded as "0". This dummy indicator will be included in regression models to further isolate possible impacts due to imputation.

Table 3–4 shows that the measure of particularism ranges from zero to five with a mean of 0.988 and a standard deviation of 0.813. The median of this measure is one. To use this measure in counterfactual models in Chapter 5, this continuous measure of particularism is grouped into a dummy variable "High in particularism" (1=particularism is higher than or equal to its median; 0=particularism is lower than its median). In 816 analytic samples, 66.5% respondents have particularism higher than or equal to its median.

Using such a measure of particularism, RP-1 is operationalized into **relational hypothesis 1 (RH-1): SMEs with higher values in particularism measure have higher values in performance index.**

Multiplexity

Social tis for both business and non-business activities are multiplexed ties. Among all kinds of non-business activities, in Chinese culture, greeting (in many different ways such as face-to-face conversations, phone calls, short messages, postcards/mails, electronic postcards/emails) and gift-giving before and during public holidays and Lunar New Year, improve sentiments between focal entrepreneurs and their business partners, strengthen the identity of "being an insider", and overlap non-business functions over business relations. Two typical non-business activities capture the essence of multiplexed social ties with three most important business partners (k=1, 2, 3):

> Greeting to *k*th business partner during public holidays (denoted as M_{k1} in Equation 3–2);
> Exchanging gifts with the *k*th business partner during Lunar New Year (M_{k2}).

Each of these questions is a yes/no question with "Yes" coded as "1" and "No" coded as "0". Using Equation 3–2, I generate a continuous measure of overall multiplexity[15].

[15] Missing values of multiplexity are imputed with its mean value. For each case, a dummy variable denoting status of imputation is generated. It will be coded as "1" if the multiplexity measure is imputed,

Since some business partners are more important than others, the contribution of *k*th most important partner to the 2002 annual sales of focal enterprises, w_k, is included in this calculation as a weighting factor. Higher values in this measure represent higher levels of multiplexity.

$$Multiplexity = \sum_{k=1}^{3}\left(w_k \sum_{i=1}^{2} M_{ki}\right) \qquad \textbf{Equation 3–2}$$
$$= w_1(M_{11} + M_{12}) + \cdots + w_3(M_{31} + M_{32})$$

Table 3–4 shows that the measure of multiplexity ranges from zero to two with an average of 1.186 and a standard deviation of 0.717. The median of this measure is one. It is clear that multiplexity is a very common practice for Chinese entrepreneurs. To include this measure in counterfactual analyses, multiplexity is cut into a dummy variable where 1 denotes multiplexity higher than or equal to its median value and 0 denotes multiplexity is lower than its median. This dummy variable shows that 71.3% of entrepreneurs have multiplexity higher than or equal to median.

Using multiplexity measured in such a way, this study operationalizes the second relational proposition into **relational hypothesis 2 (RH-2): SMEs with higher values in multiplexity measure have higher values in performance index.**

Obligation

Levels of feeling obliged to provide favors to network insiders is a critical component of the moral dimension of corporate social capital. Chinese *guanxi* ties carry stronger and more culturally coercive expectations to follow the codes of reciprocal and sometimes

otherwise it will be coded as "0". This dummy indicator will be included in regression models to further isolate possible impacts due to imputation.

self-sacrificing obligations. Two seven-point scales (7=Strongly disagree; … ; 3=So-so; … ; 1=Strongly agree) in the name generator directly measure to what extend three most important business partners feel obliged to provide favors during business transactions (k=1, 2, 3):

> To achieve his/her own goals, the *k*th business partner is rarely benevolent (denoted as O_{k1} in Equation 3–3);
> To achieve his/her own goals, the *k*th business partner takes advantages of me (O_{k2}).

Equation 3–3 generates a continuous measure of obligation by taking the relative importance of each business partners into consideration[16]. Higher values in this measure mean stronger culture of practicing obligations in doing business. Table 3–4 shows that the average obligation is 4.583 with a standard deviation of 1.625. Its median is 4.5. To use this measure in counterfactual models, this measure is cut into a dummy variable where 1 represents higher than or equal to median of this measure and 0 means lower than median level of obligation. In 816 analytic samples, 55.8% of entrepreneurs are doing business in networks with strong cultural preference of practicing obligations.

$$Obligation = \sum_{k=1}^{3}\left(w_k \frac{\sum_{i=1}^{2} O_{ki}}{2}\right) = w_1 \frac{(O_{11}+O_{12})}{2} + \cdots + w_3 \frac{(O_{31}+O_{32})}{2} \qquad \textbf{Equation 3–3}$$

Measured in this way, obligation is expected to be positively associated with performance. The RP-3 is operationalized into **relational hypothesis 3 (RH-3): SMEs with higher values in obligation measure have higher values in performance index.**

[16] Missing values of obligation are imputed with its mean value. For each case, a dummy variable denoting status of imputation is generated. It will be coded as "1" if the obligation measure is imputed, otherwise it will be coded as "0". This dummy indicator will be included in regression models to further isolate possible impacts due to imputation.

Table 3–4 Descriptive statistics of measures for relational explanations of business performance

Relational Measures	N	Mean	S.D.	Min	Max
Particularism	816	0.988	0.813	0	5
1st business partner is my kin/relative (Yes=1)	740	0.115	----	0	1
2nd business partner is my kin/relative (Yes=1)	624	0.087	----	0	1
3rd business partner is my kin/relative (Yes=1)	552	0.078	----	0	1
1st business partner was my former classmate (Yes=1)	723	0.087	----	0	1
2nd business partner was my former classmate (Yes=1)	613	0.086	----	0	1
3rd business partner was my former classmate (Yes=1)	546	0.086	----	0	1
1st business partner was my comrade-in-army (Yes=1)	709	0.034	----	0	1
2nd business partner was my comrade-in-army (Yes=1)	603	0.045	----	0	1
3rd business partner was my comrade-in-army (Yes=1)	537	0.060	----	0	1
1st business partner is my *laoxiang* (Yes=1)	719	0.089	----	0	1
2nd business partner is my *laoxiang* (Yes=1)	622	0.096	----	0	1
3rd business partner is my *laoxiang* (Yes=1)	556	0.112	----	0	1
1st business partner is my brother-like friend (Yes=1)	768	0.759	----	0	1
2nd business partner is my brother-like friend (Yes=1)	644	0.745	----	0	1
3rd business partner is my brother-like friend (Yes=1)	580	0.710	----	0	1
Particularism squared	816	1.648	3.178	0	25
High in Particularism (Yes=1)	816	0.665	----	0	1
Imputation dummy for Particularism (Imputed=1)	816	0.020	----	0	1
Multiplexity	816	1.186	0.717	0	2
Holiday greeting with 1st business partner (Yes=1)	769	0.771	----	0	1
Holiday greeting with 2nd business partner (Yes=1)	657	0.755	----	0	1
Holiday greeting with 3rd business partner (Yes=1)	588	0.752	----	0	1
Lunar new year gift exchanging with 1st business partner (Yes=1)	734	0.507	----	0	1
Lunar new year gift exchanging with 2nd business partner (Yes=1)	631	0.490	----	0	1
Lunar new year gift exchanging with 3rd business partner (Yes=1)	561	0.462	----	0	1
Multiplexity squared	816	1.944	1.601	0	4
High in Multiplexity (Yes=1)	816	0.713	0.453	0	1
Imputation dummy for Multiplexity (Imputed=1)	816	0.043	----	0	1
Obligation	816	4.583	1.231	0.429	7
1st business partner is rarely benevolent	792	4.747	1.420	1	7
2nd business partner is rarely benevolent	686	4.694	1.366	1	7
3rd business partner is rarely benevolent	621	4.626	1.434	1	7
1st business partner takes advantages of me	797	4.566	1.625	1	7
2nd business partner takes advantages of me	692	4.574	1.565	1	7
3rd business partner takes advantages of me	626	4.575	1.588	1	7
Obligation squared	816	22.554	10.969	0.184	49
High in Obligation (Yes=1)	816	0.558	----	0	1
Imputation dummy for Obligation (Imputed=1)	816	0.023	----	0	1

3.2.4 Control variables

To control effects of other possible factors on performance, two sets of control variables are introduced to regression models. The first set of control variables captures

demographic attributes of enterprises. The second set of control variables focuses on attributes of entrepreneurs (See Table 3–5 for descriptive statistics).

SMEs in the analytic sample belong to six labor-intensive industries of textile/dyeing/finishing (24.8%), metal processing (21.4%), fashion and garment (16.2%), ceramic (14.2%), furniture (12.5%), and building materials (10.9%). A set of dummy variables with furniture industry as the reference category is used as control variables of industries in regression models.

SMEs established in different historical periods may differ in current performance. In 816 cases, 22.6% of SMEs established right after the opening and reform policy took effect (1979-1991) and they were early birds in China's emerging markets. Following them, 52.2% of SMEs started their businesses after Deng Xiaoping's 1992 Southern Tour (1992-1999), which politically reassure the long-term nature and continuity of the opening and reform policy. Another 25.3% of SMEs were new ventures (2000-2003) who took the advantage of China's reaccessions to WTO on November 15, 1999. To control possible period effects, a set of dummies with "established in 1979-1991" as the reference group is used in all regression models.

Ownership effects on performance are controlled by using a set of dummies with "collective owned" as the reference category. In 816 cases, 83.1% were private/family owned enterprises and 13.6% were foreign direct invested (FDI) enterprises. Only 3.3% were collectively owned.

As a measure of enterprise-level human capital, the percentage of employees with at least high school (HS) or vocational high school (VHS) degrees in 2002 (the averaged percentage is around 16%) will be controlled in all regression models. Other important controls of enterprise attributes include: (1) A dummy variable indicating whether a SME has affiliated business ventures invested by the same entrepreneur (11.1% of SEMs in analytic sample were not the only venture invested by their owners); (2) enterprises

nominated by local governments as a *longtou* ("dragon head") enterprise (10% of sampled SMEs were *longtou* enterprises in 2002) to enjoy special policy supports.

Finally, following attributes of entrepreneurs will also be controlled: (1) age in 2002 (ranges from 22 to 76 with an average of 41.1); (2) gender (93.9% of general managers in analytical samples were male); (3) years of formal schooling by 2002 (the mean years of schooling was about 11.25, which is slightly less than senior high school ranges from primary school to BA and above); (4) CCP member status (15.9% of general managers in 2002 were Communist Party members); and (5) months of training before taking the general manager's position (on average, general managers only had less than 5 months of training).

Table 3–5 Descriptive statistics of control variables

Variable	N	Mean	S.D.	Min	Max
Enterprise attributes					
Industries					
Textile, dyeing, and finishing	816	0.248	----	0	1
Metal processing	816	0.214	----	0	1
Fashion and garment	816	0.162	----	0	1
Ceramics	816	0.142	----	0	1
Furniture (Ref.)	816	0.125	----	0	1
Building materials	816	0.109	----	0	1
Established years					
1979 – 1991 (Ref.)	811	0.226	----	0	1
1992 – 1999	811	0.522	----	0	1
2000 – 2003	811	0.253	----	0	1
Ownership					
Private/family owned	816	0.831	----	0	1
FDI/Co.Ltd.	816	0.136	----	0	1
Collectively owned (Ref.)	816	0.033	----	0	1
Has any affiliated enterprise (Yes=1)	803	0.111	----	0	1
Is *Longtou* enterprise (Yes=1)	798	0.100	----	0	1
% of employees with education above high school/ vocational high school	768	15.925	23.252	0	100
Entrepreneur attributes					
Age	813	41.095	8.920	22	76
Male (Yes=1)	814	0.939	----	0	1
Party membership (Yes=1)	811	0.159	----	0	1
Years of schooling	810	11.251	2.848	6	16
Job training experience (months)	816	4.549	12.496	0	96

3.3 Analytic strategy

Relative merits of nonrelational and relational explanations of performance will be examined by regression models in Chapter 4 and 5. In Chapter 4, my analytic strategy starts with a set of nested ordinary least square (OLS) regression models. Using performance index as the dependent variable (*Y*), a baseline model containing only control variables (*X*) will be estimated first (Equation 3–3), where *Y* is an *n* x 1 vector for *n* valid cases, *X* is an *n* x *k* matrix containing *k* control variables, α represents a constant term, β denotes a *k* x 1 coefficient vector for *k* control variables, and the error term $\varepsilon \overset{iid}{\rightarrow} N(0, \sigma^2 I)$ is assumed to follow a normal distribution with a zero mean and a constant variance of σ^2.

$$Y = \alpha + X\beta + \varepsilon \qquad \textbf{Equation 3–4}$$

Next, to evaluate nonrelational hypotheses NH-1 and NH-2, measures of nonrelational explanations will enter the baseline model as independent variables one at a time. In this step, statistically significant nonrelational variables (NV) will be retained in model (see Equation 3–5).

$$Y = \alpha + X\beta + \mathrm{NV}\gamma + \varepsilon \qquad \textbf{Equation 3–5}$$

Then, the last step of this nested OLS modeling strategy evaluates relational hypotheses RH-1, RH-2, and RH-3, one at a time. It treats NV and X as control variables and incorporates each measure of three dimensions of *guanxi*-based corporate social capital, namely particularism, multiplexity, and obligation, as an independent variable (RV), one at a time. Linear, squared, and dummy terms of RVs will be also tested in turn. OLS models in this step take on a form as Equation 3–6, where δ is the coefficient for the independent variable RV and I expect δ to be positive and statistically significant.

$$Y = \alpha + X\beta + \mathrm{NV}\gamma + RV\delta + \varepsilon \qquad \textbf{Equation 3–6}$$

OLS models defined above carry two interrelated assumptions, which guarantees γ and δ to be unbiased linear estimates of causal effects of NVs and RVs on performance: (1) independent variables NVs and RVs are exogenous reasons of performance and there is no correlation between independent variables and control variables; (2) values of independent variables are randomly assigned and there is no self-selection process to violate such randomness. These two assumptions are interrelated. If an independent variable is correlated with any control variable(s) in *X*, then that independent variable is not an exogenous reason of the dependent variable and its values are no longer randomly assigned. This is a typical scenario of endogeneity. Fortunately, this issue is less severe when we use OLS models to evaluate nonrelational hypotheses NR-1 and NR-2. Theoretically speaking, nonrelational explanations of organizational performance treat organizations as passive receivers of changing environmental factors, which are beyond the direct control of enterprises and cannot be altered by any individual enterprise. Therefore, measures of nonrelational explanations, namely factor score of truncation cost and institutional legitimacy, can be seen as exogenous reasons.

However, variables measuring relational explanations of performance do not carry such a nice exogenous nature. Instead, the endogeneity of *guanxi*-based corporate social capital measures in RH-1, RH-2, and RH-3 requires my analytical strategy to explicitly address this problem of causality. Empirical evidence has already shown (Mouw, 2003) that attributes of social network/social capital and economic outcomes tend to share some common reasons, which prevent us from detecting true causal causal effects of social capital measures. In this study, I cannot simply rule out the possibility that attributes of entrepreneurs and enterprises (some variables in *X*) causally determine RVs and performance index simultaneously. If it were the case, basic assumptions of OLS models would be violated and I have to face consequences that (1) the causal relationship

between *guanxi* measures and performance are spurious; (2) effects of *guanxi* measures are biased and inconsistent estimates due to nonrandom self-selections.

To solve this problem of causality, four methods in the counterfactual analysis framework will be conducted in Chapter 5 to adjust biased estimates of OLS models in Chapter 4. These four methods are two model-based methods of treatment effect model using regression adjustment (RA) (Heckman, 1974; Maddala, 1983) and doubly-robust estimator using inverse-probability-weighted regression adjustment (IPWRA) (Wooldridge, 2010) as well as two data-based methods of propensity-score weighting (PSW) (Rosenbaum, 1987) and propensity score matching (PSM) (Imbens, 2004; Rosenbaum, 2002; Rosenbaum & Rubin, 1983, 1985; Schafer & Kang, 2008). Unlike OLS models, counterfactual models in this study examine causal effects of *guanxi*-based corporate social capital by using *dichotomous* RVs. Following the conversion of counterfactual analysis, the category coded as "1" in a dichotomous RV (i.e. "High in particularism (Yes=1, No=0)") is called "*treatment*" and the "0"-coded category is named as "*control*." Cases with "RV=1" are cases belonging to the *treatment group*; cases with "RV=0" are cases in the *control group*. The predicted probability of "RV=1" for a case is defined as the *propensity score* for that case. The model making such a prediction is called *selection model*. Predictors in a selection model are called *confounders* ($\tilde{X}$) and usually they are a chosen subset of X, which means $\tilde{X} \in X$. The model linking an RV to the final dependent variable (performance index, denoted as Y) is called an *outcome model*.

Although all counterfactual methods aim at isolating confounder effects and approaching causal conclusions, it is still far from reaching a consensus on which modeling strategy is the best practice in the counterfactual framework (see most recent review by King and Nielsen (2016)). Therefore, careful data-driven comparisons across these approaches are needed.

To conduct data-driven comparisons, in Chapter 5, my analytic strategy starts from two model-based methods, RA and IPWRA, where selection models are conventional Probit

regressions and outcome models are OLS models. Model-based methods treat selection and outcome models as simultaneous equations whose coefficients are jointly estimated in a maximum-likelihood procedure. These methods depend on Probit regressions to explicitly model how cases are assigned to the treatment group given observed confounders ($\tilde{X}$). This requirement implies that researchers have already known the correct specification of selection models, including correct inclusion of $\tilde{X}$, correct transformation (such as taking square, natural logarithm, square-root, and etc.) of variables in $\tilde{X}$, and correct interaction terms between variables in $\tilde{X}$. As a pioneering research of *guanxi*-based corporate social capital, this study has to face a lack of preexisting theories and empirical guidelines to reach correct specifications of selection models.

To overcome this problem of model misspecification, I conduct two data-based methods, namely PSW and PSM, where estimated propensity scores are obtained from Generalized Boost Model (GBM) (Friedman, 2001, 2002; Hastie, Tibshirani, & Friedman, 2009; Ridgeway, 1999, 2012). Based on the theory of regression tree, GBM automatically identifies selection models with optimal transformations and interactions of variables in $\tilde{X}$ and estimates propensity scores with higher precision comparing to manually specified Probit regressions (Loh, 2011). Using propensity scores estimated in this way, data-based methods make changes (weighting and pruning) to observed data so that treatment-status assignments of RVs in the new data can be approximately random. In data-based methods, there is no need to explicitly model how cases are assigned to the treatment group and the outcome models are conventional OLS models.

At the end of Chapter 5, I will compare findings derived from five modeling strategies, namely OLS, RA, IPWRA, PSW, and PSM, and then draw causal conclusions of how *guanxi*-based corporate social capital determining business performance of SMEs in China.

Chapter 4 Statistical Results from OLS Models

4.1 Baseline Model

This chapter provides a series of preliminary tests of the non-relational and relational hypotheses of business performance using traditional OLS models. The tests start from a baseline model where the dependent variable is performance index and independent variables are enterprise and entrepreneur attributes.

Model 1 in Table 4–1 regresses performance index on enterprise attributes. Comparing to the reference group of furniture industry, SMEs in industries of textile (-0.367, $p<0.001$), metal processing (-0.260, $p<0.01$), and ceramics (0.809, $p<0.001$) show significant difference in performance. Some SMEs have affiliated subcompanies. A dummy variable indicating this status is significantly and positively predicting performance (0.364, $p<0.01$). Some SMEs were designated as leading enterprises, or "*Longtou*" (dragon heads) in Chinese, by local governments and were entitled to special policy supports, such as faster approval of loans with larger amount and lower interest rates from local commercial banks, direct governmental investments, special government purchases, and etc. Model 1 shows that being *Longtou* SMEs is positively related to performance (0.690, $p<0.001$). This result reminds us that in China's on-going economic reform, local governments are playing an influential role to seal the fate of private businesses.

Another measure of corporate attributes is human capital of employees. Percentage of employees with high school (HS) or vocational high school (VHS) degrees is positively and significantly related to performance (0.013, $p<0.001$). Even if SMEs in the analytic sample were labor-intensive factories, education of employees is still a crucial factor to increase productivity and business performance. This result is highly consistent with interviews of entrepreneurs in local furniture industry: highly educated professional R&D teams generated an important human capital advantage in a highly competitive industry

because of their taste and creativity to design fashionable and feature-rich new products. Except for these effects, Model 1 shows no significant performance difference across established years and ownerships.

Model 2 in Table 4–1 further incorporates entrepreneur attributes and demonstrates a significant political capital effect on performance. Entrepreneurs with Communist Party membership tended to run their businesses more successfully (0.365, $p<0.001$), all other things equal. Roughly 16% of entrepreneurs in the analytic sample were Party members at the time of survey. Their political loyalty rewarded them in the business world: entrepreneurs with Party membership have higher frequencies to interact with local Party and government officials, higher legitimacy to participate in local policy-making, and more chances to obtain insider-only information. These exclusive opportunities eventually generate unique competitive advantages for these "red" entrepreneurs. Except for these effects, Model 2 shows no significant age, gender, and educational[17] effects on performance.

Regardless of statistical significance, all variables in Model 2 will also be treated as controls in following OLS models because of their theoretical importance. And including these variables makes my models comparable to similar studies that control these attributes.

[17] Insignificance of those three measures cannot be simply explained as the lack of human capital effect on performance. In fact, the effect of entrepreneur human capital on performance is highly possible to be mediated by the ownership dummy of "FDI/Co. Ltd" (0.439, $p<0.05$). Confined to 570 analytic sample in Model 2, a t-test of averaged educational years of entrepreneurs between FDI and non-FDI SMEs shows that FDI entrepreneurs has a mean educational years of 13.34 (above senior high school level) 2.62 years longer than non-FDI entrepreneurs. The difference of is statistically significant ($p<0.001$) and substantially. Similar t-test is also conducted to compare mean months of professional training between FDI and non-FDI entrepreneurs. The averaged lengths of training for FDI entrepreneurs is 14.15 months and this value is only 2.30 months for non-FDI entrepreneurs. Such a difference of 11.85 months is both statistically ($p<0.001$) and substantially significant. Combining findings above, FDI SMEs tend to have highly educated and better trained entrepreneurs, the human capital effect of entrepreneurs is highly possible to be mediated by the ownership status.

Table 4–1 Baseline Model

Performance Index	**(1)**	**(2)**
Enterprise attributes		
Industries (Ref. = Furniture)		
Textile, dyeing, and finishing	-0.367***	-0.345***
	(0.093)	(0.091)
Metal processing	-0.260**	-0.283**
	(0.096)	(0.095)
Fashion and garment	-0.097	-0.105
	(0.108)	(0.107)
Ceramics	0.809***	0.698***
	(0.134)	(0.134)
Building materials	0.115	0.023
	(0.117)	(0.116)
Established year (Ref. = 1979-1991)		
1992 – 1999	-0.025	-0.029
	(0.075)	(0.074)
2000 – 2003	-0.104	-0.099
	(0.091)	(0.090)
Ownership (Ref. = Collective owned)		
Private/family owned	-0.243	0.005
	(0.183)	(0.190)
FDI/Co.Ltd.	0.305	0.439*
	(0.199)	(0.204)
Has any affiliated enterprise (Yes=1)	0.364**	0.340**
	(0.112)	(0.111)
Is *Longtou* enterprise (Yes=1)	0.690***	0.572***
	(0.113)	(0.113)
% of employees with education above HS/VHS	0.013***	0.012***
	(0.001)	(0.001)
Entrepreneur attributes		
Age (year)		0.000
		(0.003)
Male (Yes=1)		0.190
		(0.113)
Years of schooling		0.023
		(0.012)
Party membership (Yes=1)		0.365***
		(0.094)
Job training experience (months)		0.006
		(0.003)
Constant	0.038	-0.665*
	(0.203)	(0.318)
Adjusted R-square	0.454	0.476
N	574	570

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001

4.2 Non-relational Hypotheses of Performance

Hypotheses of transaction cost (NH-1) and institutional legitimacy (NH-2) are tested in this section. Model 1 in

Table 4–2 does not support transaction cost hypothesis of performance. NH-1 expects to see that factor score of transaction cost has positively and significantly effect on performance index. However, transaction cost factor in Model 1 shows no significant effect on performance. It seems that a hypothesis derived from observations of large enterprises in mature market economies that have the capability to incorporate risky market transactions into their internal bureaucratic structures is less powerful to explain performance of SMEs in an emerging market economy.

Next, Model 2 in

Table 4–2 strongly supports the hypothesis of institutional legitimacy. NH-2 predicts that enterprises with higher institutional legitimacy have higher performance. Model 2 shows that, all other things equal, one unit higher in the measure of institutional legitimacy will lead to 0.112 unit increase in the performance index ($p<0.01$). Since the measure of institutional legitimacy is a sum of three dummies, namely having CPC branch (yes=1), having labor's union (yes=1), and having worker's congress (yes=1), an SME with all those three institutional constructs will on average yield 0.336 higher in the performance index comparing to SMEs that had comparable attributes but refused to adopt these institutions. During China's on-going economic reform, institutional legitimacy of private businesses comes from active internalization of the Party's ideology and compliance with institutional arrangements that are politically correct. SMEs with higher institutional legitimacy tend to follow ideological guidance and legal regulations of the Party and local governments more closely. Such active internalization and compliance make SMEs face less institutional discrimination and equip them with stronger bargaining power when interacting with local authorities. Political loyalty and institutional alignment will be rewarded in terms of policy supports and political/legal protections. And this advantage is productive and generates better performance.

Table 4–2 Models of Non-relational Hypotheses of Performance

Performance Index	(1)	(2)
Transaction Cost Theory	0.013	
	(0.043)	
Institutional Legitimacy		0.112**
		(0.037)
Enterprise attributes		
Industries (Ref. = Furniture)		
Textile, dyeing, and finishing	-0.311***	-0.289**
	(0.092)	(0.092)
Metal processing	-0.213*	-0.244*
	(0.097)	(0.095)
Fashion and garment	-0.087	-0.089
	(0.107)	(0.106)
Ceramics	0.739***	0.726***
	(0.134)	(0.133)
Building materials	0.064	0.054
	(0.117)	(0.116)
Established year (Ref. = 1979-1991)		
1992 – 1999	-0.037	-0.018
	(0.073)	(0.073)
2000 – 2003	-0.106	-0.075
	(0.089)	(0.090)
Ownership (Ref. = Collective owned)		
Private/family owned	0.005	0.075
	(0.189)	(0.190)
FDI/Co.Ltd.	0.450*	0.497*
	(0.203)	(0.203)
Has any affiliated enterprise (Yes=1)	0.314**	0.324**
	(0.111)	(0.110)
Is *Longtou* enterprise (Yes=1)	0.546***	0.549***
	(0.113)	(0.113)
% of employees with education above HS/VHS	0.012***	0.012***
	(0.001)	(0.001)
Entrepreneur attributes		
Age (year)	0.205	0.205
	(0.113)	(0.112)
Male (Yes=1)	0.001	-0.000
	(0.003)	(0.003)
Years of schooling	0.021	0.017
	(0.012)	(0.012)
Party membership (Yes=1)	0.374***	0.311**
	(0.094)	(0.095)
Job training experience (months)	0.006*	0.006*
	(0.003)	(0.003)
Constant	-0.633*	-0.764*
	(0.316)	(0.317)
Adjusted R-square	0.482	0.484

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N=570

4.3 Relational Hypotheses of Performance

Due to the fact that institutional legitimacy plays a significant role in predicting performance of SMEs, models in this section will include the institutional legitimacy variable as a statistical control in addition to enterprise and entrepreneur attributes. In all models, each relational hypothesis will be tested using its continuous and dummy measures. Possible curvilinear effects will also be tested by quadratic terms.

This modeling strategy is suitable for this study. First, relational hypotheses of performance proposed in Chapter 3 are hypotheses of linear effects where measures of particularism, multiplexity, and obligation are expected to promote performance in a linear manner. These linear hypotheses can be falsified if there is any reversed U-shape relationship between *guanxi* measures and performance, which means that after certain thresholds increasing magnitudes of *guanxi* measures will start to harm performance. Second, dichotomous *guanxi* measures are tested so that OLS models in this chapter can be compared to counterfactual models in Chapter 5, where SMEs with lower-than-median *guanxi* measures will be treated as control-group observations and SMEs with greater-or-equal-to-median measures will be used as treatment-group cases.

Model 1(a) through Model 1(c) in Table 4–3 examines the effects of particularism on performance index (RH-1). In Model 1(a), the continuous measure of particularism shows a positive (0.057) but statistically insignificant effect on performance index in a two-tailed test. However, if I conduct a directional test, then the effect of particularism is significant at $p<0.05$, one-tailed. This result suggests that, other things equal, each unit increase in the measure of particularism makes the performance index increase by a 0.057 unit on average. Model 1(b) introduces a squared term of particularism and both the squared (-0.047, $p<0.05$) and linear (0.226, $p<0.05$) terms are significant.

A significant and negative squared term in Model 1(b) seems to suggest a reversed U-shape relation between particularism and performance index. Particularism first

increases performance until it reaches 2.404[18] when the predicted performance reaches its peak value. Then further increasing of particularism will start to decrease performance. Such a result seems not fully supporting RH-1 where the hypothesized relationship is linear. To better understand this inconsistency between observed data and RH-1, I depict this curvilinear relationship between particularism and performance in Figure 4–1 (long-dash line). In the same figure, I further include the linear fit based on Model 1(a) (solid line) and its 95% confidence interval (gray area surrounding the solid line) of the predicted mean performance for each given value of particularism. It is clear that for most of the cases (depicted as solid dots), the curvilinear line falls into the 95% CI of linear predictions. Only when particularism reaches its maximum value of 5, two extreme cases (dots a solid circle) drags the quadratic line slightly out of the 95% CI.

Based on this graphical presentation, my assessment is that Model 1(a) and Model 1(b) are almost identical and this quadratic relationship can be ignored. This assessment is supported by another two pieces of evidence. First, the difference of adjusted r-squares between Model 1(a) ($R^2 = 0.485$) and Model 1(b) ($R^2 = 0.490$) is not statistically significant. Second, a non-parametric Locally Weighted Scatterplot Smoothing (LOWESS) curve (dot-dash line in Figure 4–1) that is less sensitive to extreme cases (Cleveland, 1979; Cleveland & Devlin, 1988) remains within the 95% CI of the linear fit even when particularism reaches its maximum value.

Model 1(c) tests significance of a dummy measure of particularism. This dummy variable is coded "1" when continuous particularism measure is greater or equal to its median and it is coded "0" when particularism is less than its median. Results from Model 1(c) show a significant effect of particularism on performance: all other things equal, SMEs with median and above-median levels of particularism perform significantly better (0.147, $p<0.05$) than similar SMEs with particularism lower than sample median.

[18] Let $\frac{\partial Y}{\partial x} = 2\times(-0.047)x + 0.226 = 0$ and solve the equation to obtain the first-order stationary point of particularism=2.404

Empirical results of Model 1 (a), (b), and (c) consistently support my RH-1 that all other things equal higher level of particularism leads to higher performance.

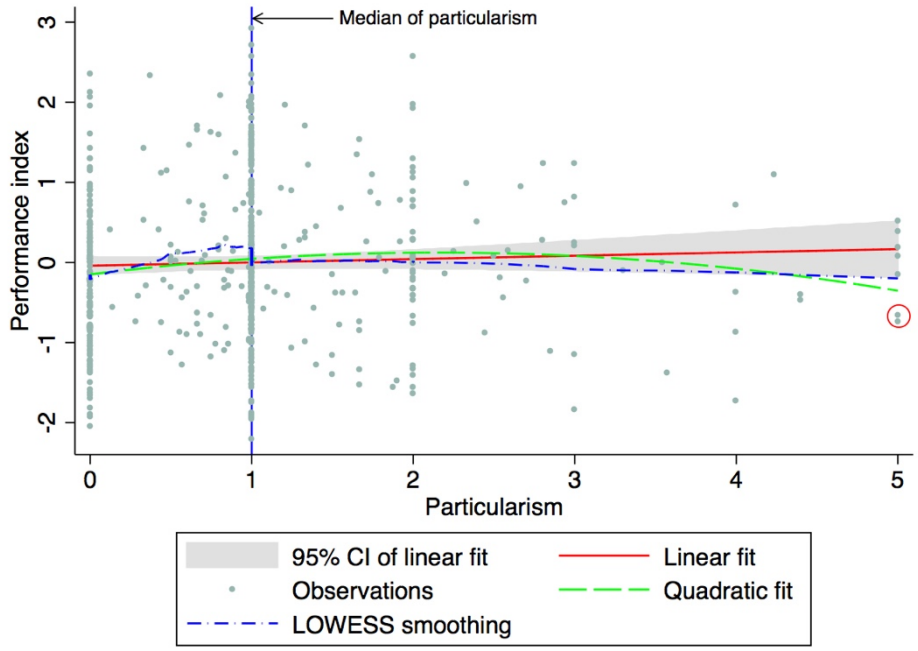

Figure 4–1 Scatter plot, linear fit, 95% confidence interval of linear fit, quadratic fit, and LOWESS (bandwidth = 0.35) of performance index against particularism

The same modeling strategy applies to tests of multiplexity (RH-2). Model 2(a) in Table 4–3 demonstrates a significant, positive, and linear effect of multiplexity on performance (0.193, $p<0.001$). All other things equal, one unit increase in multiplexity will lead to 0.193 unit increase in performance index. SMEs with multifunctional ties perform better than similar SMEs embedded in social networks of simplex (or say function-specific) ties. Model 2(b) includes a squared term of multiplexity measure and tries to capture possible curvilinear relationship. The squared term of multiplexity fails to be significant at 0.05 level. The lack of statistically significant quadratic effect of multiplexity is consistent with the prediction in RH-2.

Finally, Model 2(c) tests the effect of multiplexity dummy on performance. The multiplexity dummy equals to 1 when the continuous measure of multiplexity is greater

or equal to its median. And this dummy is zero when multiplexity measure is less than its median. Result shows that this multiplexity dummy is statistically significant (0.291, $p<0.001$). Comparing to SMEs with multiplexity lower than median, SMEs higher level of multiplexity perform significantly better, *ceteris paribus*. RH-2 is completely supported by observed data.

To evaluate RH-3 that all other things equal, higher level of obligation leads to higher performance, Model 3(a), (b), and (c) are conducted. Model 3(a) in Table 4–3 examines linear effect of obligation on performance. Significant and positive (0.065, $p<0.01$) result supports RH-3 clearly. All other things equal, one unit increase in obligation will generate 0.065 unit increase in performance index on average. That is to say that SMEs with *guanxi* ties high in mutual and reciprocal obligations to help each other perform significantly better. Model 3(b) tries to detect possible reversed U-shape relationship between obligation and performance but it fails to show any statistically significant quadratic effect of obligation. Model 3(c) replaces the continuous measure of obligation with its dummy measure. The obligation dummy is defined as 1 when the continuous obligation measure is greater or equal to its own median. This dummy will be 0 when continuous obligation measure is less than its median. Result indicates that controlling all other effects, SMEs enjoying median or above median level of obligated supports perform significantly better comparing to SMEs receiving less obligated supports. RH-3 is therefore fully supported.

Table 4–3 Models of Relational Hypotheses of Performance

Performance Index	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	(3a)	(3b)	(3c)
Particularism									
Continuous measure	0.057	0.226**							
	(0.033)	(0.075)							
Squared		-0.047*							
		(0.019)							
High in Particularism (Yes=1)			0.147*						
			(0.062)						
Multiplexity									
Continuous measure				0.193***	0.368**				
				(0.040)	(0.142)				
Squared					-0.082				
					(0.064)				
High in Multiplexity (Yes=1)						0.291***			
						(0.066)			
Obligation									
Continuous measure							0.065**	0.159	
							(0.025)	(0.156)	
Squared								-0.011	
								(0.017)	
High in Obligation (Yes=1)									0.121*
									(0.058)
Institutional Legitimacy	0.110**	0.100**	0.103**	0.088*	0.082*	0.082*	0.110**	0.112**	0.110**
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Enterprise attributes									
Industries (Ref. = Furniture)									
Textile, dyeing, and finishing	-0.283**	-0.276**	-0.276**	-0.316***	-0.294**	-0.260**	-0.309***	-0.309***	-0.303**
	(0.092)	(0.092)	(0.092)	(0.091)	(0.092)	(0.091)	(0.092)	(0.092)	(0.093)
Metal processing	-0.238*	-0.210*	-0.218*	-0.247**	-0.216*	-0.190*	-0.259**	-0.262**	-0.262**
	(0.095)	(0.095)	(0.095)	(0.093)	(0.096)	(0.094)	(0.095)	(0.095)	(0.095)
Fashion and garment	-0.082	-0.080	-0.086	-0.090	-0.091	-0.092	-0.116	-0.112	-0.103
	(0.106)	(0.106)	(0.106)	(0.104)	(0.104)	(0.105)	(0.106)	(0.107)	(0.106)
Ceramics	0.731***	0.734***	0.738***	0.713***	0.731***	0.755***	0.704***	0.700***	0.707***
	(0.133)	(0.133)	(0.133)	(0.131)	(0.131)	(0.131)	(0.133)	(0.133)	(0.133)
Building materials	0.053	0.070	0.074	0.036	0.050	0.076	0.026	0.020	0.027
	(0.116)	(0.115)	(0.116)	(0.113)	(0.114)	(0.114)	(0.116)	(0.116)	(0.116)
Established year (Ref. = 1979-1991)									
1992 – 1999	-0.020	-0.024	-0.023	-0.019	-0.026	-0.033	0.005	0.006	-0.005
	(0.073)	(0.073)	(0.073)	(0.072)	(0.072)	(0.072)	(0.074)	(0.074)	(0.073)

2000 – 2003	-0.098	-0.095	-0.095	-0.092	-0.095	-0.099	-0.053	-0.051	-0.061
	(0.091)	(0.090)	(0.090)	(0.088)	(0.088)	(0.088)	(0.090)	(0.090)	(0.090)
Ownership (Ref. = Collective owned)									
Private/family owned	0.081	0.077	0.087	0.140	0.144	0.115	0.007	-0.001	0.032
	(0.190)	(0.190)	(0.190)	(0.187)	(0.187)	(0.188)	(0.191)	(0.192)	(0.191)
FDI/Co.Ltd.	0.508*	0.501*	0.508*	0.518**	0.537**	0.525**	0.422*	0.415*	0.453*
	(0.203)	(0.202)	(0.203)	(0.199)	(0.200)	(0.200)	(0.204)	(0.205)	(0.204)
Has any affiliated enterprise (Yes=1)	0.314**	0.282*	0.286*	0.291**	0.293**	0.303**	0.301**	0.302**	0.298**
	(0.111)	(0.111)	(0.112)	(0.108)	(0.108)	(0.109)	(0.110)	(0.111)	(0.111)
Is *Longtou* enterprise (Yes=1)	0.553***	0.552***	0.552***	0.544***	0.543***	0.531***	0.529***	0.529***	0.538***
	(0.113)	(0.113)	(0.113)	(0.111)	(0.111)	(0.111)	(0.113)	(0.113)	(0.113)
% of employees with education above HS/VHS	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Entrepreneur attributes									
Age (year)	0.196	0.200	0.198	0.179	0.175	0.178	0.202	0.206	0.216
	(0.112)	(0.112)	(0.112)	(0.110)	(0.110)	(0.111)	(0.112)	(0.112)	(0.112)
Male (Yes=1)	-0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Years of schooling	0.018	0.021	0.018	0.015	0.014	0.015	0.018	0.018	0.017
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Party membership (Yes=1)	0.330***	0.328***	0.330***	0.353***	0.357***	0.344***	0.291**	0.290**	0.296**
	(0.096)	(0.095)	(0.095)	(0.094)	(0.094)	(0.094)	(0.095)	(0.095)	(0.095)
Job training experience (months)	0.006*	0.006	0.006*	0.006*	0.006*	0.007*	0.007*	0.007*	0.007*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.818*	-0.965**	-0.891**	-1.032**	-1.090***	-1.002**	-0.996**	-1.194**	-0.806*
	(0.319)	(0.323)	(0.321)	(0.315)	(0.318)	(0.316)	(0.329)	(0.462)	(0.318)
Adjusted R-square	0.485	0.490	0.487	0.505	0.505	0.501	0.488	0.488	0.486

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N = 570

4.4 Preliminary Conclusions

OLS models in this chapter provide a conventional and straightforward set of empirical tests of non-relational and relational hypotheses. Institutional legitimacy is a statistically significant non-relation explanation of business performance. In China's institutional context, SMEs having active CPC branches, maintaining formal unions, and using worker's congress to solve critical agendas successfully align their internal management structure to external environment. Such an alignment generates institutional legitimacy that will be rewarded by political protections and special policies. As a result, performance increases can be expected.

By controlling effects of enterprise and entrepreneur attributes as well as institutional advantage, OLS models in this chapter also strongly support all three relational hypotheses. All other things equal, SMEs with *guanxi* network that are strong in interpersonal particularism, rich in multi-functional ties, and high in obligation perform better. Social ties strong in sentimental particularism qualify focal entrepreneurs as core insiders in *guanxi* networks and entitle them to access to insider-only favors, such as time-sensitive business opportunities, accurate market information, low or no-interest financial supports, unique marketing channels, and etc. Particular ties are difficult to establish and time-consuming to maintain. Fortunately, multiplex nature of *guanxi* ties stacks multiple functions to a social tie so that entrepreneurs don't have to establish k strong-ties for k different purposes. Instead, only m *guanxi* ties are needed to fulfill k functions and m is considerably smaller than k. SMEs rich in multifunctional ties are more efficient to utilize networks resources in business practices. Finally, *guanxi* ties emphasizing moral obligations to provide reciprocal favors among network members provide an additional competitive advantage to SMEs. The constant flow of favors and strong moral sanctions on opportunistic behaviors embed entrepreneurs into safety nets against unexpected risks and fluctuations of the market.

OLS models assume parallel causal effects of independent variables on the outcome variable. As depicted in Figure 4–2 Panel A, performance is assumed to be determined, independently and directly, by attributes of enterprise and entrepreneurs and *guanxi* dimensions. Using statistical terminology, both enterprise/entrepreneur attributes and *guanxi* dimensions are strict exogenous reasons in models of performance. The assumption of parallel causality may be violated. One violation is suggested by Mouw (2003) and illustrated in Panel B of Figure 4–2. Mouw suggests that in observational studies, observed status of social capital measures are not randomly assigned to respondents. Instead, strategic self-selections based on people's free will and rational choices tend to determine values of social capital measures. Applying Mouw's suggestion to my study, I have to assume that observed status of particularism, multiplexity, and obligation are determined entrepreneurs' personal attributes and intrinsic characteristics of their businesses. When enterprise and entrepreneur attributes are reasons for *guanxi* measures and performance simultaneously, the causal path from *guanxi* to performance will be spurious. To response to this challenge of causality, Chapter 5 makes further refinements and adjustments to models in Table 4–3 using techniques of counterfactual analysis.

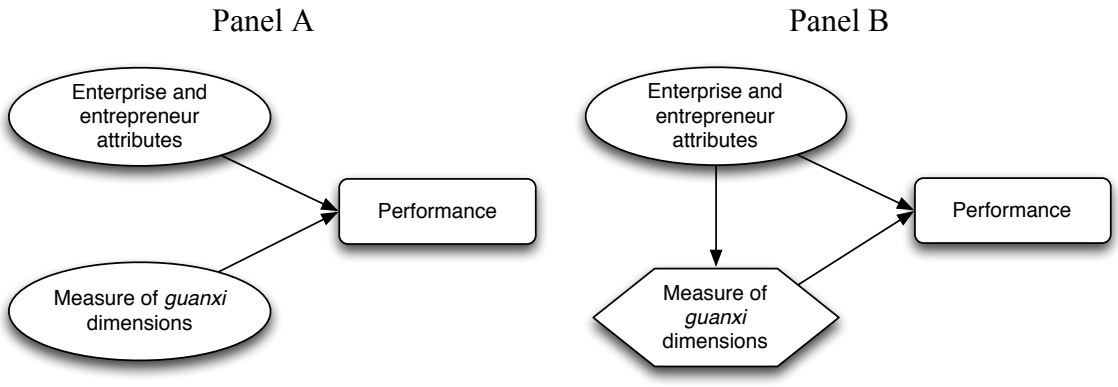

Figure 4–2 Possible confounders and problems of making causal conclusions

Chapter 5 Counterfactual Models

To reassess the relational explanations tested in the previous chapter with greater analytical rigor and statistical sophistication, this chapter presents the results about causal effects of *guanxi* measures on performance index by addressing the *guanxi* endogeneity problem in a counterfactual framework. This chapter starts with a brief introduction to basic concepts and terminologies of counterfactual analysis, and then it moves to four counterfactual techniques that evaluate causal effects of particularism (RH-1), multiplexity (RH-2), and obligation (RH-3) on performance of SMEs. Finally, I will conduct rigorous regression diagnostics to detect and resolve other possible violations of OLS assumptions (such as influential outliers, normality, and homoscedasticity). This additional step of model refinement puts my conclusions on a much stronger statistical basis.

5.1 Concepts and Terminologies of Counterfactual Analysis

OLS models in Chapter 4 lend empirical supports to all three relational hypotheses of performance under the assumption of parallel causality. In Chapter 4, OLS models are defined as Equation 5-1[19]

$$Y = \alpha + X\beta + \gamma d + \varepsilon \qquad \textbf{Equation 5-1}$$

where Y is the dependent variable of performance index, an $n\times 1$ column vector for n valid cases; X is an $n\times k$ matrix containing k control variables including enterprise

[19] This chapter uses symbols according to the convention of counterfactual analysis. The dependent variable is denoted as Y. Control variables are columns of matrix X. Accent tilde (~) means "a strict subset of"; matrix $\tilde{X}$ contains some but not all columns of matrix X. Continuous and dichotomous independent variables are denoted by d and w, respectively. Superscript asterisk (*) means "a latent variable of"; w^* is the unobserved latent variable of w. Greek letters are parameters of regression models.

attributes, entrepreneur attributes, and measures of institutional legitimacy; *d* is the independent variable of *guanxi* measures (particularism, multiplexity, or obligation); α is the constant term; β is a $k\times1$ coefficient vector for control variables; γ is the coefficient for the independent variable *d*; and $\varepsilon\sim N(0,\sigma^2 I)$ is the error term following a normal distribution with mean of zero and a constant variance of σ^2.

Equation 5-1 assumes that (1) independent variable *d* is an exogenous reason for the dependent variable and there is no correlation among components on the right-hand side of Equation 5-1; (2) values of independent variable *d* are randomly acquired and there is no endogenous self-selection process to jeopardize the randomness of *d*. Such an assumption, as discussed in Chapter 3, is highly possible to be violated. OLS models with violation of exogenous assumption generate biased estimates of causal effects of *guanxi* measures on performance.

Counterfactual models try to solve this problem. To conduct counterfactual analyses, continuous independent variable *d* in Equation 5-1 has to be replaced by its dummy form. I use *w* to denote dichotomized independent variable *d*. For particularism, I assign *w*=1 to SMEs with median or higher-than-median level of particularism and assign *w*=0 to SMEs with less-than-median level of particularism. To another two *guanxi* measures, multiplexity and obligation, the same coding scheme applies. In the counterfactual terminology, *w* is called the "status of treatment assignment". Cases in the "treatment group" have *w*=1 and cases in the "control group" have *w*=0. And w_i denotes the **observed** treatment assignment status for the i^{th} case. Variables that determine both *w* and *Y* simultaneously are called confounders and are denoted as $\tilde{X}$. Models regressing *w* on $\tilde{X}$ are called selection models. The predicted probability of w_i is the propensity score (denoted as *ps*) of belonging to the treatment group for the i^{th} case.

Models regressing *Y* on *X* and *w* are outcome models. An outcome model defines the causal effect using the idea of potential outcomes. For case *i*, we say a treatment assignment w_i is causally determining outcome Y_i if and only if we observe none-zero

$\delta_i = Y_i^1 - Y_i^0$, where δ_i is the causal effect of *w* on case *i*, Y_i^1 refers to the outcome of case *i* after it received the treatment w_i; Y_i^0 refers to the outcome of case *i* if **the same case** had not received the treatment w_i. For any case in the analytic sample what I can observe is either Y_i^1 or Y_i^0, or say $Y_i = Y_i^1 w_i + Y_i^1(1 - w_i)$. If I observe Y_i^1 when $w_i = 1$, then Y_i^0 will be the potential outcome for case *i*. If I observe Y_j^0 when $w_j = 0$, then Y_j^1 will be the potential outcome for case *j*. The expectation of all Y_i^1, denoted as $E(Y_i^1)$, is an estimate of mean outcome for the entire population if everyone in this population receives treatment *w*. Similarly, $E(Y_i^0)$ is the estimated mean for the entire population if no one in this population receives treatment *w*. The causal effect of *w* for the entire population, denoted as Δ, is then defined as Equation 5-2

$$\Delta = \mu_1 - \mu_0 = E(Y_i^1) - E(Y_i^0) \qquad \textbf{Equation 5-2}$$

In a random experiment, it is true that outcomes of the experiment, Y^0 or Y^1, is statistically independent from how cases are chosen into treatment and control groups: $(Y^1, Y^0) \perp\!\!\!\perp w$[20]. Such a statistical independence guarantees following reasoning:

Given $(Y^1, Y^0) \perp\!\!\!\perp w$,

$$E(Y|w = 1) = E[Y^1 w + Y^0(1 - w)|w = 1] = E(Y^1|w = 1) = E(Y^1)$$

and

$$E(Y|w = 0) = E[Y^1 w + Y^0(1 - w)|w = 0] = E(Y^0|w = 0) = E(Y^0)$$

Therefore, the population causal effect of *w* can be obtained from this experiment since $E(Y|w = 1) - E(Y|w = 0) = E(Y^1) - E(Y^0) = \Delta$.

[20] To simplify further discussions, subscript *i* will be omitted whenever there is no confusion about omitting this subscript.

However, in an observational data with confounded treatment assignment, we have $(Y^1, Y^0) \not\perp w$. So that,

$$E(Y|w=1) \neq E(Y^1)$$
$$E(Y|w=0) \neq E(Y^0)$$
$$\Longrightarrow \hat{\Delta} = E(Y|w=1) - E(Y|w=0) \neq \Delta$$

The difference between $\hat{\Delta}$ and Δ is the bias of estimating causal effect of *w* on *Y* using observational data.

To eliminate the bias, counterfactual analysis identifies all confounders $\tilde{X} \in X$ and generates a conditional independence of $(Y^1, Y^0) \perp\!\!\!\perp w|\tilde{X}$, so that we can have:

$$E\big[E\big(Y|w=1,\tilde{X}\big)\big] = E\big[E\big(Y^1|w=1,\tilde{X}\big)\big] = E\big[E\big(Y^1|\tilde{X}\big)\big] = E(Y^1)$$

$$E\big[E\big(Y|w=0,\tilde{X}\big)\big] = E\big[E\big(Y^0|w=0,\tilde{X}\big)\big] = E\big[E\big(Y^0|\tilde{X}\big)\big] = E(Y^0)$$

Therefore,

$$E(Y^1) - E(Y^0) = E\big\{\big[E\big(Y^1|w=1,\tilde{X}\big)\big] - E\big[E\big(Y^0|w=0,\tilde{X}\big)\big]\big\} = \Delta$$

This is the definition of average treatment effect (ATE) in the counterfactual framework, an unbiased estimate of causal effect of *w* on *Y*:

$$ATE = E[(Y^1|w=1) - (Y^0|w=0)|\tilde{X}] \qquad \textbf{Equation 5-3}$$

In this research, ATE is the effect of a *guanxi* measure on the performance for the entire SME population in the PRD area. As a related concept, the average treatment effect for the treated (ATT) is defined in Equation 5-4.

$$ATT = E[(Y^1 - Y^0)|\tilde{X}, w=1] \qquad \textbf{Equation 5-4}$$

ATT shows another flavor of causal effect of *w*. It denotes the difference between the observed outcomes of members in the treatment group after they are treated by *w* and potential outcomes when these treatment group members were not exposed to the treatment of *w* (Guo & Fraser, 2010). In this research ATT means the difference between the performance of SMEs with median or higher-than-median value of a *guanxi* measure and the potential performance outcome of the same group of SMEs if they had lower than median value of that *guanxi* measure. ATE is the major concern for this research. Whenever it is possible, ATT will also be calculated as an auxiliary statistic to double-check the reliability of conclusions derived from ATEs.

Finally, counterfactual models in this chapter assume that there are no unobserved confounders. That is to say that we assume that all reasons determining treatment assignments *w* and *Y* are observed in the data and are included in selection models as $\tilde{X}$. Whether this assumption is true or not is beyond the scope of this research and it is a very tough and an ultimate question for any social science research using observational data. Like most of counterfactual analyses in the current literature, this research takes this assumption for granted.

5.2 Testing Relational Hypotheses with Treatment Effect Models

The treatment effect model follows Heckman's econometric tradition that transforms a selection-bias problem to an omitted-variable bias problem (Maddala, 1983). This method is more feasible than using instrumental variable[21]. Treatment effect model reaches ATE by explicitly modeling how an endogenous treatment assignment *w* is

[21] An instrumental variable (IV) is an observed variable that is highly correlated with the problematic independent variable suffering from endogeneity but at the same time statistically independent from the error term in Equation 5-1. The advantage of using an IV is that it is possible to keep the continuous measure of the endogenous independent variable in models. The drawback of using an IV is that it is very difficult to justify any observed variable as an IV. This method is not conducted in this research.

causally determined by confounders $\tilde{X}$. In this research, the outcome model is defined as Equation 5-5.

$$Y = \alpha + X\beta + w_i\gamma + \varepsilon \quad \textbf{Equation 5-5}$$

And the selection model predicting the treatment assignment of *w* is defined as Equation 5-6.

$$w^* = \tau + \tilde{X}\theta + u \quad \textbf{Equation 5-6}$$

where w^* is a latent variable determining observed status of *w*: if $w^* > 0$ then *w*=1; if $w^* \leq 0$ then *w*=0; τ is the constant term; θ is a $m \times n$ column vector for m ($m \leq k$) confounders in $\tilde{X}$, and *u* is the error term following normal distribution. With the definition of Equation 5-6, the conditional probabilities of observing *w*=1 can be written like Equation 5-7[22]:

$$ps = Prob(w = 1|\tilde{X}) = \Phi(\tilde{X}\theta) \quad \textbf{Equation 5-7}$$

$Prob(w = 1|\tilde{X})$ is the propensity score (*ps*) representing the tendency of belonging to the treatment group. $\Phi(\cdot)$ is the cumulative normal distribution function (Normal CDF). Treatment effect model assumes that the error terms ε in outcome model (Equation 5-5) and the error term *u* in selection model (Equation 5-6) follow a bivariate normal distribution with a mean of zero and a covariance matrix of $\begin{pmatrix} \sigma_\varepsilon & \rho \\ \rho & 1 \end{pmatrix}$, where σ_ε is a constant variance of error term ε in Equation 5-5 and ρ is the correlation between two error terms. In Stata, parameters of Equation 5-5 and Equation 5-6 are estimated by maximum likelihood. And a χ^2 test of $H_0: \rho = 0$ is conducted to evaluate adequacy of model specification. When the null hypothesis H_0 can be rejected, the model specification is adequate.

Models 1 through 3 in Table 5–1 summarize ATE of particularism, multiplexity, and obligation on performance index, respectively. Results in Table 5–1 fail to support any

[22] Probit model is used as selection model in this research. But it is completely adequate to model the selection by Logit models.

relational hypothesis and suggest no causal relation between *guanxi* dimensions and performance.

χ^2 tests of model specification are needed before I can conclude the lack of *guanxi* effects on performance. Last row of Table 5–1 shows χ^2 statistics and significance for parameter ρ. It is clear that for all three models χ^2 statistics are not significantly different from zero. This indicates misspecification of the selection model, which makes the insignificant *guanxi* effects misleading.

The treatment effect model is very sensitive to model misspecifications. Any misspecification in the outcome and/or selection models will make parameter estimates biased and invalidate hypothesis tests (Guo & Fraser, 2010). As a pioneering study of endogenous *guanxi* effects on performance, I have to face a lack of empirical knowledge of the selection process of *w* in current literature. There is also no useful theoretical guideline for this research to answer the following two critical questions on Equation 5-6: (1) do I include all possible confounders and their interaction terms and (2) what are the correct functional transformations the selection model? Other counterfactual methods are needed to solve this problem.

Table 5–1 Treatment effect models for causal effects of three *guanxi* dimensions on SME performance index (see full table in Appendix A)[23]

Performance Index	**(1)**	**(2)**	**(3)**
High in Particularism (Yes=1)	0.005		
	(0.652)		
High in Multiplexity (Yes=1)		0.420	
		(0.721)	
High in Obligation (Yes=1)			0.456
			(0.540)
Hyperbolic tangent of ρ	0.133	-0.122	-0.321
	(0.612)	(0.678)	(0.519)

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N = 570

[23] R-squares can not be defined for models estimated by maximum likelihood method.

5.3 Testing Relational Hypotheses with Doubly Robust Estimators

One solution to the aforementioned model misspecification is "doubly robust estimator" (DRE) (see technical details in Funk, Westreich, Davidian, & Wiesen, 2010; Guo & Fraser, 2010; Robins, Rotnitzky, & Zhao, 1994). Like the treatment effect model, DRE explicitly models selection process of *w*. The substantial advantage of DRE is that if either the outcome or the selection model is free from misspecification, then estimates of endogenous *guanxi* effect will be consistent (asymptotically unbiased when sample size is large enough). That is a desired feature for this research. Even if I don't know the correct equation for the selection model, I do know, under the guideline of theories, a very plausible outcome model. Therefore, using DRE I can still get causal effects of *guanxi* measures on performance index. Technical details of this doubly robust feature are included in Appendix B.

In practice, DRE is implemented by a family of similar methods. In this research, I use the algorithm of "Inverse-Probability-Weighted Regression Adjustment (IPWRA)", a built-in feature of Stata Version 13, to obtain doubly robust estimator of each *guanxi* measure. Using IPWRA, both ATE and ATT of *guanxi* effects can be calculated and are presented in Table 5–2.

Model (1a) in Table 5–2 shows a significant and positive effect of particularism on performance (0.169, $p<0.01$). Comparing to SMEs with similar enterprise and entrepreneur attributes but lower particularism, SMEs with median and higher-than-median level of particularism perform significantly better. This finding supports my RH-1. And this conclusion is further confirmed by ATT in Model (1b) (0.190, $p<0.01$) that if SMEs with observed high-level particularism were assigned low particularism status then their performance index would be 0.190 unit lower on average. Model (2a) examines causal effect of multiplexity on performance. Result shows that comparing to SMEs with similar attributes, SMEs high in multiplexity perform significantly better (0.208, $p<0.01$). RH-2 is supported. The ATT in Model (2b) reassure this conclusion (0.188, $p<0.05$).

Model (3a) and (3b) show the significant causal effect of obligation on performance (0.133, $p<0.05$), which support RH-3.

Models using DRE support all three relational explanations of performance. The doubly robust nature of DRE provides a better solution than the treatment effect model, yet as a model-based adjustment of endogeneity DRE is still not a completely satisfactory solution when severe misspecification of selection models cannot be fully corrected. Data-based methods in the counterfactual framework are needed to further confirm conclusions of *guanxi* effects on performance.

Table 5–2 Inverse-Probability-Weighted Regression Adjustment (IPWRA) models for causal effects of three *guanxi* dimensions on SME performance index (see full table in Appendix A)[24]

Performance Index	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
	ATE	ATT	ATE	ATT	ATE	ATT
High in Particularism (Yes=1)	0.169**	0.190**				
	(0.060)	(0.064)				
High in Multiplexity (Yes=1)			0.208**	0.188*		
			(0.075)	(0.087)		
High in Obligation (Yes=1)					0.113*	0.112^
					(0.057)	(0.062)

^ $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$; N = 570

5.4 Testing Relational Hypotheses with Propensity-Weighted Data

To overcome the misspecification of selection models, the Generalized Boost Model (GBM) is conducted to estimate propensity scores. The GBM as a machine learning method has a significant advantage over parametric Probit models: it is an artificial intellectual technique using regression tree and automatically identifies optimal linear and nonlinear functional transformations as well as interactions of confounders $\tilde{X}$ so that the predicted propensity scores can be very accurate. Appendix C summarizes confounders that are automatically identified by GBM as most important predictors for each endogenous *guanxi* measure.

[24] R-squares can not be defined for models estimated by maximum likelihood method.

The missing randomness of treatment assignment *w* can be restored by weighting analytic samples with *ps*. After weighting, cases with similar values on enterprise and entrepreneur attributes will carry higher weights while cases with dissimilar values on these confounders have lower weights. By doing so, the weighted data show less systematical difference in confounders across treatment status and cases with similar confounding attributes will dominate regression results[25]. That is to say that when sample size is large, regression models using propensity-score-weighted data can reveal consistent causal effects of *w* just like what a random experiment data can do (Guo & Fraser, 2010).

Model (1a) in Table 5–3 supports RH-1 with a significant ATE of particularism on performance index (0.142, $p<0.05$). SMEs that are high in particularism perform significantly better. ATT in Model (1b) further assure this conclusion (0.144, $p<0.05$). Model (2a) shows support to RH-2 that SMEs with high level of multiplexity perform better (0.275, $p<0.001$). And this conclusion is further backed up by ATT in Model (2b) (0.275, $p<0.001$). Finally, Model (3a) supports RH-3 with a significant ATE of obligation (0.112, $p<0.05$) and an ATT of 0.118 ($p<0.05$) in Model (3b).

Table 5–3 Propensity-score-weighted regression models for causal effects of three guanxi dimensions on SME performance index (see full table in Appendix A)

Performance Index	**(1a)**	**(1b)**	**(2a)**	**(2b)**	**(3a)**	**(3b)**
	ATE	ATT	ATE	ATT	ATE	ATT
High in Particularism (Yes=1)	0.142*	0.144*				
	(0.062)	(0.062)				
High in Multiplexity (Yes=1)			0.275***	0.275***		
			(0.067)	(0.068)		
High in Obligation (Yes=1)					0.112*	0.118*
					(0.057)	(0.057)
Adjusted R-square	0.473	0.472	0.514	0.518	0.479	0.480

^ $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$; N = 570

[25] Technical details of how to assign weights to cases are included in Appendix D.

All relational hypotheses are consistently supported by regression models using propensity-weighted data. However, I have to consider a drawback of this method: weights that deviate far from 1 will introduce unintended problem to regression models. Appendix E summarizes weights used in above models. It is clear that maximum weights for ATE and ATT of particularism reach 3.992 and 2.992 respectively; maximum weights for ATE and ATT of multiplexity reach 5.278 and 4.278 respectively. Therefore, conclusions derived from these regression models need further confirmations.

5.5 Testing Relational Hypotheses with Propensity-Matched Data

Propensity matching is another way to restore randomness to *guanxi* measures *w*. This method is substantially different from previous three methods. Once propensity scores are obtained from GBM, observed cases in the treatment and control groups sharing very similar propensity scores are matched together. Cases in the treatment group with propensity scores that are not similar to any cases in the control group will be pruned. In this way, a new data with smaller sample size is generated. Since propensity score is an confounder-balancing score, two cases, one from the treatment group and one from the control group, with similar propensity scores will also have almost identical values on confounders $\tilde{X}$. In a propensity-score-matched data, therefore, confounders $\tilde{X}$ and treatment assignment *w* are statistically independent from each other so that estimates of ATEs using matched data are causal effects because except for the difference in treatment assignments *w*, there is no systematical difference in any confounding attributes.

There are different ways to achieve propensity-score matching. I use the 1-to-1 nearest-neighbor matching with a preset clipper, a quantitative definition of "similar propensity scores", to implement matching. Following the convention, I set the clipper to be one-forth of the standard deviation of predicted propensity score, which is believed to be an optimal choice (Guo & Fraser, 2010).

Two methods are used to demonstrate that there is no systematical difference in confounding attributes after propensity matching. The first method is independent-sample T-test. Using the treatment variable as the grouping variable, a T-tests detects mean difference of confounding attributes between cases in treatment and control groups. What I expect to see is significant T-test results using unmatched data and insignificant T-test results using matched data. The second method is an overall propensity-balancing test based on pseudo-R-square of Logistic regression. In a Logistic model, set the treatment assignment w as the dependent variable and set confounders $\tilde{X}$ as independent variables. Run this Logistic model using unmatched data. Since w can be very well predicted by $\tilde{X}$, the pseudo-R-square tends to be large. Run the same Logistic model again but using matched data, where $\tilde{X}$ is balanced across w. So, I expect to see a very low or almost zero pseudo-R-square. If the pseudo-R-square reduces across data, then balancing of $\tilde{X}$ across w via propensity matching is achieved.

Table 5–4 summarizes T-test results of $\tilde{X}$ before and after propensity matching for the treatment dummy of particularism. It is very clear that attributes like belonging to machinery industry and has affiliated enterprise(s) in unmatched data show significant between-group mean difference. And that significant difference disappears in the matched data. That is to say that the only systematic difference left in this matched data is the dummy variable of high in particularism. Table 5–5 shows the pseudo-R-squared for Logistic model of treatment assignment on $\tilde{X}$ is 0.037 ($p<0.01$) using unmatched data. This measure reduced to almost zero (and statistically insignificant) using matched data. These two tests consistently show that the matched data effectively eliminates between-group difference in $\tilde{X}$. Therefore, regression models using this matched data can reach causal effect of particularism on performance index free from confoundedness.

Table 5–6 and

Confounders	**Mean attributes before matching**		**Mean attributes after matching**		**T-test of group mean difference after matching**	
	High	Low	High	Low	t	p>|t|

Enterprise attributes						
Industries						
Textile, dyeing, and finishing	0.234	0.319	0.235	0.225	0.39	0.700
Metal processing	0.202	0.280	0.203	0.205	-0.06	0.950
Fashion and garment	0.155	0.103	0.151	0.165	-0.62	0.536
Ceramics	0.150	0.123	0.151	0.153	-0.09	0.926
Building materials	0.110	0.098	0.111	0.108	0.14	0.891
Established year						
1992 – 1999	0.546	0.505	0.550	0.549	0.03	0.976
2000 – 2003	0.247	0.260	0.249	0.255	-0.23	0.818
Ownership						
Private/family owned	0.826	0.863	0.831	0.829	0.06	0.955
FDI/Co.Ltd.	0.133	0.118	0.132	0.138	-0.29	0.771
Has any affiliated enterprise (Yes=1)	0.125	0.069	0.119	0.118	0.04	0.970
Is *Longtou* enterprise (Yes=1)	0.107	0.059	0.102	0.010	0.14	0.891
% of employees with education above HS/VHS	16.713	13.613	16.676	17.222	-0.37	0.714
Entrepreneur attributes						
Age (year)	0.938	0.941	0.938	0.931	0.45	0.656
Male (Yes=1)	40.514	42.49	40.550	40.487	0.12	0.907
Years of schooling	11.473	10.706	11.452	11.415	0.21	0.833
Party membership (Yes=1)	0.157	0.152	0.158	0.161	-0.14	0.889
Job training experience (months)	5.012	4.075	4.982	4.935	0.06	0.954

Table 5–7 demonstrate how $\tilde{X}$ is effectively balanced in the matched data for treatment assignment of multiplexity. All T-tests for mean difference of $\tilde{X}$ using the matched data show insignificant results. And pseudo-R-squared for the Logistic model is almost zero and statistically insignificant using the matched data. The matched data effectively removes between-group difference in $\tilde{X}$. And regression models using this matched data can get causal effect of multiplexity on performance index. Same logic applies to $\tilde{X}$ balancing for treatment assignment of high in obligation. Table 5–8 and

Confounders	**Mean attributes before matching**		**Mean attributes after matching**		**T-test of group mean difference after matching**	
	High	Low	High	Low	t	p>|t|
Enterprise attributes						
Industries						
Textile, dyeing, and finishing	0.247	0.270	0.251	0.266	-0.48	0.629
Metal processing	0.247	0.194	0.248	0.275	-0.85	0.394
Fashion and garment	0.132	0.152	0.134	0.128	0.24	0.809
Ceramics	0.156	0.124	0.149	0.141	0.33	0.739
Building materials	0.117	0.094	0.117	0.107	0.45	0.654
Established year						
1992 – 1999	0.521	0.552	0.524	0.498	0.72	0.473
2000 – 2003	0.237	0.267	0.238	0.252	-0.46	0.648
Ownership						

Private/family owned	0.858	0.809	0.856	0.860	-0.18	0.860
FDI/Co.Ltd.	0.115	0.145	0.117	0.102	0.66	0.509
Has any affiliated enterprise (Yes=1)	0.134	0.079	0.122	0.117	0.20	0.845
Is *Longtou* enterprise (Yes=1)	0.108	0.076	0.099	0.084	0.74	0.458
% of employees with education above HS/VHS	17.442	13.893	17.131	16.965	0.10	0.922
Entrepreneur attributes						
Age (year)	0.927	0.955	0.926	0.915	0.56	0.579
Male (Yes=1)	40.836	41.336	40.839	40.895	-0.09	0.928
Years of schooling	11.330	11.176	11.283	11.386	-0.51	0.607
Party membership (Yes=1)	0.193	0.109	0.184	0.172	0.44	0.660
Job training experience (months)	3.969	5.725	3.978	3.604	0.49	0.625

Table 5–9 show that the matched data successfully balances $\tilde{X}$. And that matched data can show causal effect of obligation on performance.

Table 5–4 Heterogeneity in attributes of entrepreneurs and enterprises before and after propensity matching for particularism

Confounders	Mean attributes before matching		Mean attributes after matching		T-test of group mean difference after matching	
	High	Low	High	Low	t	p>|t|
Enterprise attributes						
Industries						
Textile, dyeing, and finishing	0.254	0.264	0.256	0.241	0.55	0.583
Metal processing	0.192	0.289	0.195	0.203	-0.31	0.757
Fashion and garment	0.158	0.105	0.148	0.147	0.04	0.967
Ceramics	0.150	0.126	0.150	0.158	-0.31	0.758
Building materials	0.102	0.117	0.104	0.110	-0.30	0.764
Established year						
1992 – 1999	0.544	0.515	0.547	0.534	0.40	0.689
2000 – 2003	0.258	0.234	0.258	0.262	-0.14	0.888
Ownership						
Private/family owned	0.838	0.833	0.841	0.837	0.20	0.838
FDI/Co.Ltd.	0.124	0.138	0.126	0.124	0.11	0.914
Has any affiliated enterprise (Yes=1)	0.138	0.050	0.124	0.126	-0.08	0.939
Is *Longtou* enterprise (Yes=1)	0.096	0.088	0.094	0.098	-0.25	0.805
% of employees with education above HS/VHS	16.200	15.140	16.098	16.444	-0.22	0.823
Entrepreneur attributes						
Age (year)	0.942	0.933	0.941	0.947	-0.38	0.707
Male (Yes=1)	40.850	41.498	40.915	40.864	0.09	0.928
Years of schooling	11.282	11.218	11.238	11.197	0.23	0.821
Party membership (Yes=1)	0.148	0.172	0.148	0.144	0.18	0.855
Job training experience (months)	4.945	4.353	4.753	4.420	0.41	0.681

Table 5–5 Overall propensity-balancing test for particularism

Sample from	Pseudo R2	LR chi2	p>chi2

Raw data	0.037	34.45	0.007
Matched data	0.001	1.89	1.000

Table 5–6 Heterogeneity in attributes of entrepreneurs and enterprises before and after propensity matching for multiplexity

Confounders	Mean attributes before matching		Mean attributes after matching		T-test of group mean difference after matching	
	High	Low	High	Low	t	p>|t|
Enterprise attributes						
Industries						
Textile, dyeing, and finishing	0.234	0.319	0.235	0.225	0.39	0.700
Metal processing	0.202	0.280	0.203	0.205	-0.06	0.950
Fashion and garment	0.155	0.103	0.151	0.165	-0.62	0.536
Ceramics	0.150	0.123	0.151	0.153	-0.09	0.926
Building materials	0.110	0.098	0.111	0.108	0.14	0.891
Established year						
1992 – 1999	0.546	0.505	0.550	0.549	0.03	0.976
2000 – 2003	0.247	0.260	0.249	0.255	-0.23	0.818
Ownership						
Private/family owned	0.826	0.863	0.831	0.829	0.06	0.955
FDI/Co.Ltd.	0.133	0.118	0.132	0.138	-0.29	0.771
Has any affiliated enterprise (Yes=1)	0.125	0.069	0.119	0.118	0.04	0.970
Is *Longtou* enterprise (Yes=1)	0.107	0.059	0.102	0.010	0.14	0.891
% of employees with education above HS/VHS	16.713	13.613	16.676	17.222	-0.37	0.714
Entrepreneur attributes						
Age (year)	0.938	0.941	0.938	0.931	0.45	0.656
Male (Yes=1)	40.514	42.49	40.550	40.487	0.12	0.907
Years of schooling	11.473	10.706	11.452	11.415	0.21	0.833
Party membership (Yes=1)	0.157	0.152	0.158	0.161	-0.14	0.889
Job training experience (months)	5.012	4.075	4.982	4.935	0.06	0.954

Table 5–7 Overall propensity-balancing test for multiplexity

Sample from	Pseudo R2	LR chi2	p>chi2
Raw data	0.044	38.54	0.002
Matched data	0.001	1.23	1.000

Table 5–8 Heterogeneity in attributes of entrepreneurs and enterprises before and after propensity matching for obligation

Confounders	Mean attributes before matching		Mean attributes after matching		T-test of group mean difference after matching	
	High	Low	High	Low	t	p>|t|
Enterprise attributes						
Industries						
Textile, dyeing, and finishing	0.247	0.270	0.251	0.266	-0.48	0.629
Metal processing	0.247	0.194	0.248	0.275	-0.85	0.394
Fashion and garment	0.132	0.152	0.134	0.128	0.24	0.809
Ceramics	0.156	0.124	0.149	0.141	0.33	0.739
Building materials	0.117	0.094	0.117	0.107	0.45	0.654
Established year						
1992 – 1999	0.521	0.552	0.524	0.498	0.72	0.473
2000 – 2003	0.237	0.267	0.238	0.252	-0.46	0.648
Ownership						
Private/family owned	0.858	0.809	0.856	0.860	-0.18	0.860
FDI/Co.Ltd.	0.115	0.145	0.117	0.102	0.66	0.509
Has any affiliated enterprise (Yes=1)	0.134	0.079	0.122	0.117	0.20	0.845
Is *Longtou* enterprise (Yes=1)	0.108	0.076	0.099	0.084	0.74	0.458
% of employees with education above HS/VHS	17.442	13.893	17.131	16.965	0.10	0.922
Entrepreneur attributes						
Age (year)	0.927	0.955	0.926	0.915	0.56	0.579
Male (Yes=1)	40.836	41.336	40.839	40.895	-0.09	0.928
Years of schooling	11.330	11.176	11.283	11.386	-0.51	0.607
Party membership (Yes=1)	0.193	0.109	0.184	0.172	0.44	0.660
Job training experience (months)	3.969	5.725	3.978	3.604	0.49	0.625

Table 5–9 Overall propensity-balancing test for obligation

Sample from	Pseudo R2	LR chi2	p>chi2
Raw data	0.051	51.97	0.000
Matched data	0.005	5.35	0.997

Using matched data, OLS regressions are conducted to test the true causal effects of *guanxi* dimensions to performance. Model 1 in Table 5–10 confirms the causal statement in RH-1. Comparing to SMEs with low particularism, SMEs enjoying high level of particularism perform significantly better (0.142, $p<0.05$). Model 2 strongly supports the causal reasoning in RH-2 that comparing to similar SMEs, SMEs with high level of multiplexity perform significantly better (0.285, $p<0.001$). Finally, Model 3 supports the causal effect of obligation on performance (0.157, $p<0.05$) as what is predicted by RH-3.

Table 5–10 OLS regression models for causal effects of three *guanxi* dimensions on SME performance index using propensity-score-matched data (see full table in Appendix A)

Performance Index	(1)	(2)	(3)
High in Particularism (Yes=1)	0.142*		
	(0.070)		
High in Multiplexity (Yes=1)		0.285***	
		(0.078)	
High in Obligation (Yes=1)			0.157*
			(0.066)
Adjusted R-square	0.479	0.523	0.465
N	342	325	439

^ $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

5.6 Regression Diagnostics of Models with Propensity-Matched Data

Models in Table 5–10 fully support all three relational explanations of performance. The endogeneity issue of *guanxi* measures is effectively solved in this counterfactual framework. Regression models using matched data, however, are by nature OLS models that carry strong assumptions in addition to the parallel causality assumption. In this section, I conduct regression diagnostics on Model 1 through 3 in Table 5–10 and then refine these models by excluding most influential outliers and calculating robust standard errors to make my conclusions more conservative.

5.6.1 Diagnostics of particularism model

OLS estimates are sensitive to extreme cases. Left panel of Figure 5–1 illustrates Cook's distance, a measure of abnormality, against case ID number. In all 342 cases, case #167

has the highest Cook's distance. Right panel of Figure 5–1 is an influence plot including studentized residual as vertical axis, hat-value as horizontal axis[26], and Cook's distance as the diameter of circles. It is clear that case #167 has very large residual, the largest Cook's distance, and a very strong influence on estimates. It is the outlier case that will be remove from Model 1.

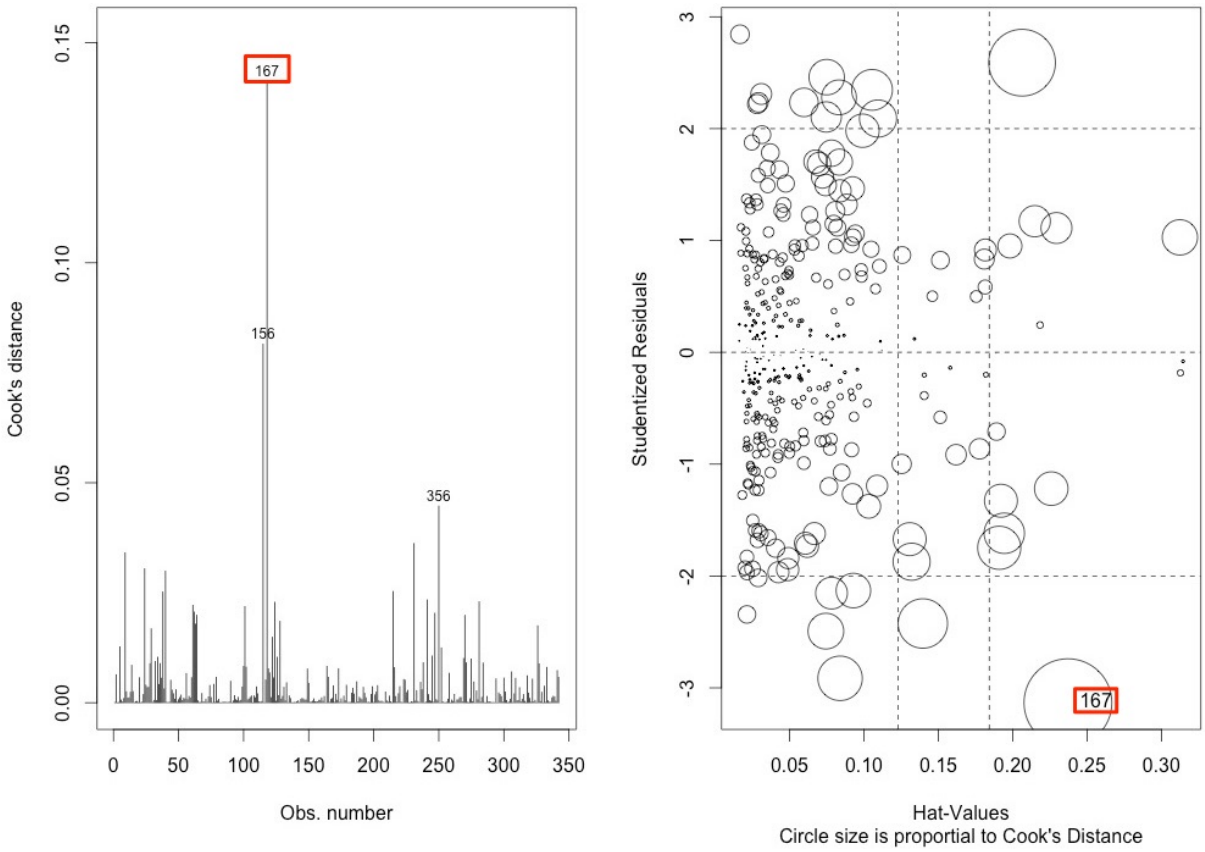

Figure 5–1 Cook's Plot and Influence Plot for observation with largest Cook's distance

The assumption of error term following normal distribution with zero mean and constant variance is very critical for reliable hypothesis testing of regression parameters. Two panels in Figure 5–2 depict cumulative distribution function (a Q-Q plot) and probability

[26] Hat-value comes from the diagonal of H matrix in OLS which is defined as $H = X(X^T X)^{-1} X^T$. Values h_{ii} in H are also called leverage values and cases with larger leverages tend to dominate estimates more heavily.

density function of studentized residuals (histogram with normal distribution reference lines). The Q-Q plot in the left panel of Figure 5–2 shows no noticeable deviation between the cumulative distribution of residuals (circles in the Q-Q plot) and the normal CDF (solid line reference line in the Q-Q plot). Most residuals locate very close to the normal reference line and normality assumption is not violated. Right panel of Figure 5–2 further confirms this conclusion and it also shows that the mean of studentized residuals is very close to zero (further T-test fails to reject the null hypothesis that mean studentized residual is zero, $t=0.0001<t_{c.v.}=1.96$). To sum up, residuals of Model 1 follow normal distribution with mean of zero.

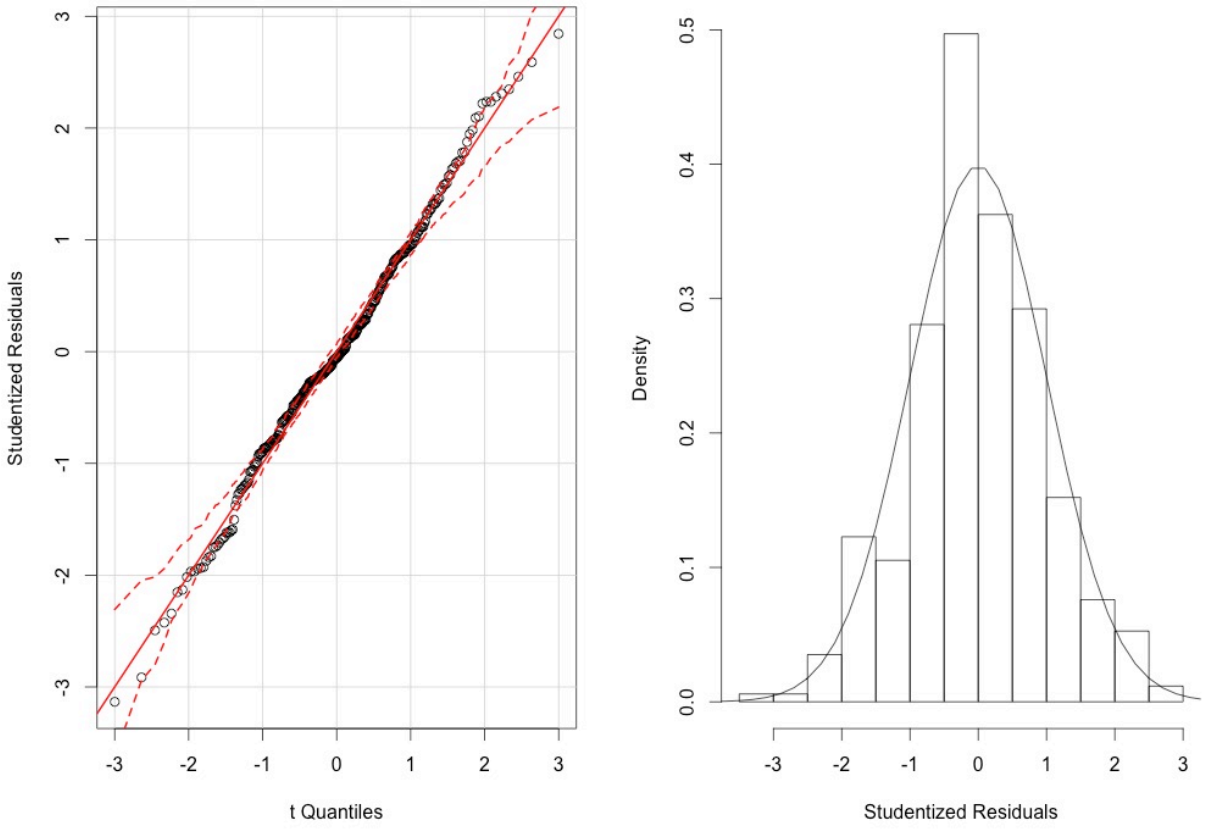

Figure 5–2 Checking normality with cumulative and density distribution plots of studentized residuals

The error term in an OLS model also needs to follow a constant variance across the entire regression surface. Violation of this assumption of homoscedasticity will not generate biased coefficients but it causes inaccurate estimate of standard errors of coefficients so that hypothesis testing of any coefficient against zero will be affected.

It is possible to detect violation of this assumption using graphs. The left panel of Figure 5–3 is a plot of studentized residual vs. model predicted performance index. If homoscedasticity assumption holds, then scatters in this graph are randomly and evenly distributed. It is clear, however, that (1) scatters concentrate around zero (shown by the dash reference line) when predicted values of performance index are small; (2) points on this panel show wider dispersion when predicted values of dependent variable get larger. This pattern depicts a violation of homoscedasticity and further Chi-square test of homoscedasticity assumption turns out to be significant (Chi-square = 5.962, df=1, $p<0.05$). When facing heterscedasticity, there are two commonly used solutions. First, certain functional transformation of dependent variable can be helpful; second, robust standard errors for coefficients should be used if there is neither clear pattern in residual-predicted value plot nor useful function transformation. One minus the slope of the solid line in the spread-level plot[27] (right panel of Figure 5–3) can be a possible power transformation of dependent variable to solve this non-constant variance problem. The slope of the solid line in the spread-level plot is almost zero, so there are no further useful transformations other than *Y* in its linear form. The only solution left is to use robust standard errors in testing regression coefficients[28].

[27] When drawing spread-level plot, cases with negative predicted performance index will be excluded and negative studentized residuals are transformed to their absolute values.

[28] In Stata 13, the robust standard error matrix for all regression parameters is calculated by $S.E._{Robust} = (X'X)^{-1}[\sum_{i=1}^{n}(e_i x_i)'(e_i x_i)](X'X)^{-1}$, where X' is the transpose of the matrix X containing all right-hand-side variables; n is the analytic sample size; e_i is the residual for i^{th} case; and x_i is the vector containing all independent variables and constant for the i^{th} case (source: http://www.stata.com/support/faqs/statistics/standard-errors-and-vce-cluster-option/).

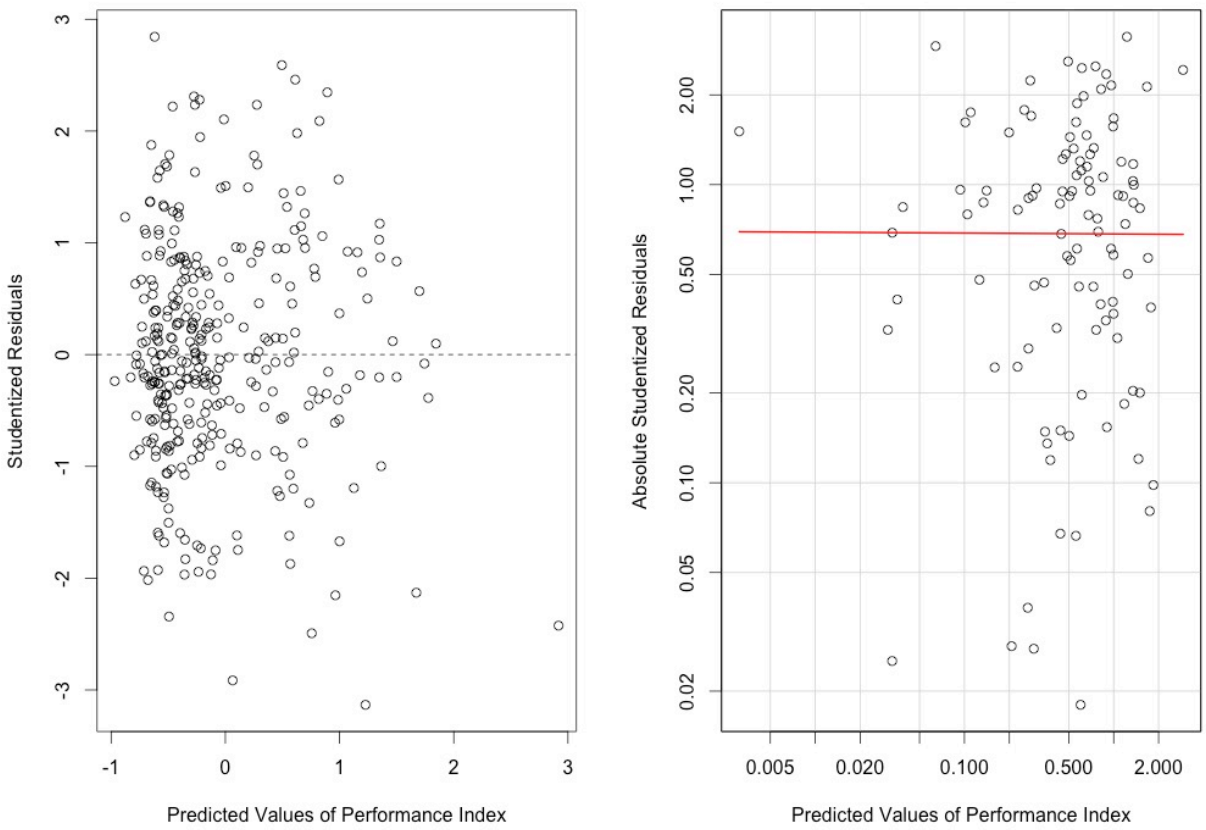

Figure 5–3 Checking non-constant error variance (heteroscedasticity)

5.6.2 Diagnostics of multiplexity model

Similar diagnostics apply to Model 2 in Table 5–10. Cook's distance plot and influence plot in Figure 5–4 identify two outliers that have strongest influence on model estimates, case #165 and #304. These two cases will be excluded.

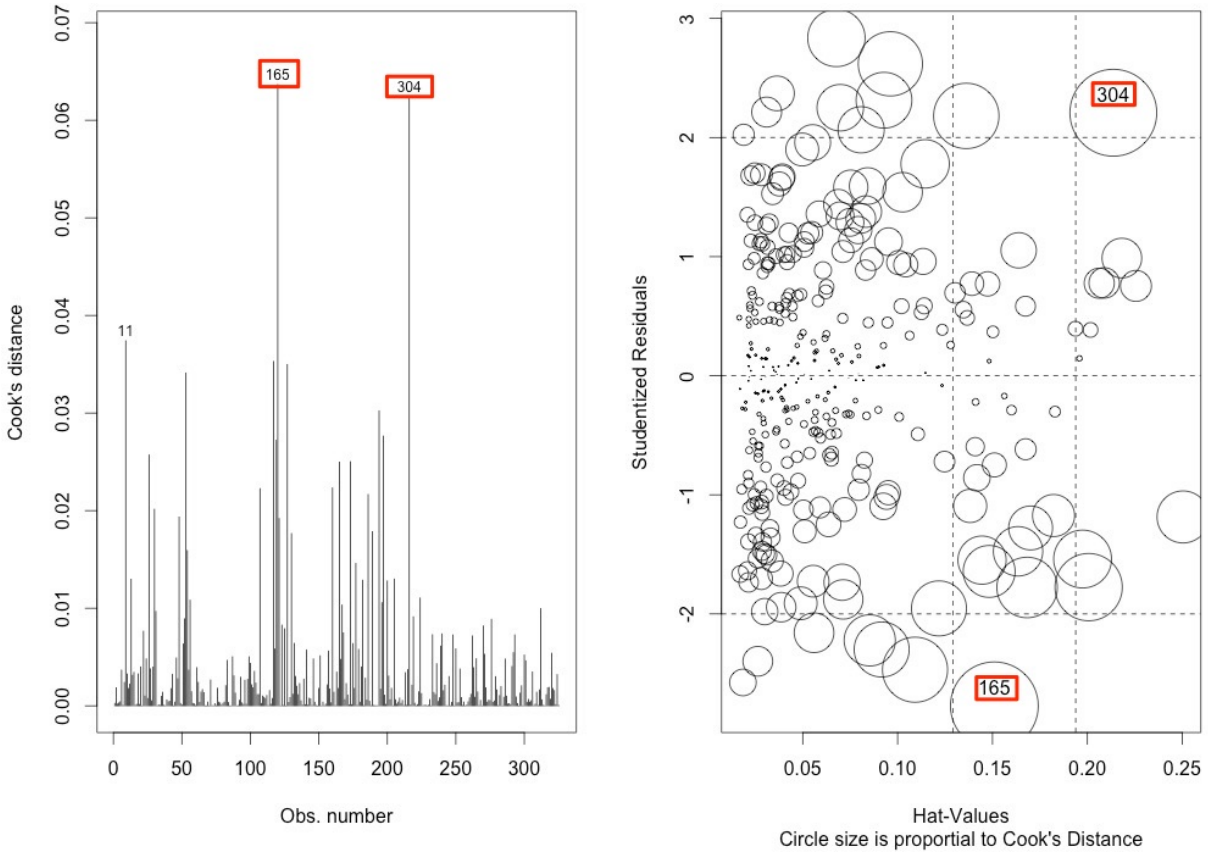

Figure 5–4 Cook's Plot and Influence Plot for observation with largest Cook's distance

Figure 5–5 checks normality of model residuals. The Q-Q plot shows no significant violation of normal assumption since all points in this Q-Q plot locate very close to the normal reference line (solid line in this plot). Further, a histogram of studentized residuals is plotted against the reference curve of normal PDF. There is no significant inconsistency identified and T-test of mean residuals against zero is not statistically significant ($t=-0.0009>t_{c.v.}=-1.96$). Model 2 is free from violation of normality.

Figure 5–6 depicts homoscedasticity assumption of regression error term. The scatter plot of studentized residual vs. predicted performance index demonstrates a pattern of heterscedasticity. Variance of residuals increases with larger and larger predicted values of performance index. The spread-level plot in the right panel of Figure 5–6 suggest a power transformation of dependent variable to be $Y^{0.9}$, which is almost identical to its

original linear form used in Model 2. Since there is no useful power transformation of the dependent variable to solve this non-constant variance problem, robust standard errors will be calculated to make statistical inferences more valid.

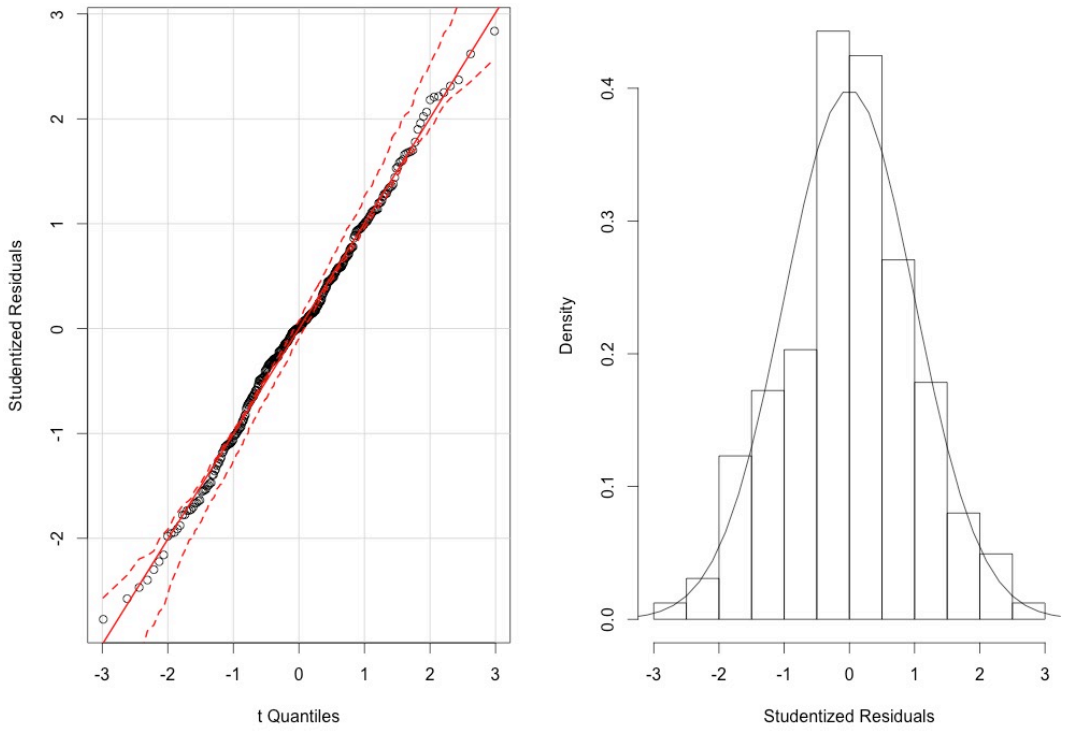

Figure 5–5 Checking normality with cumulative and density distribution plots of studentized residuals

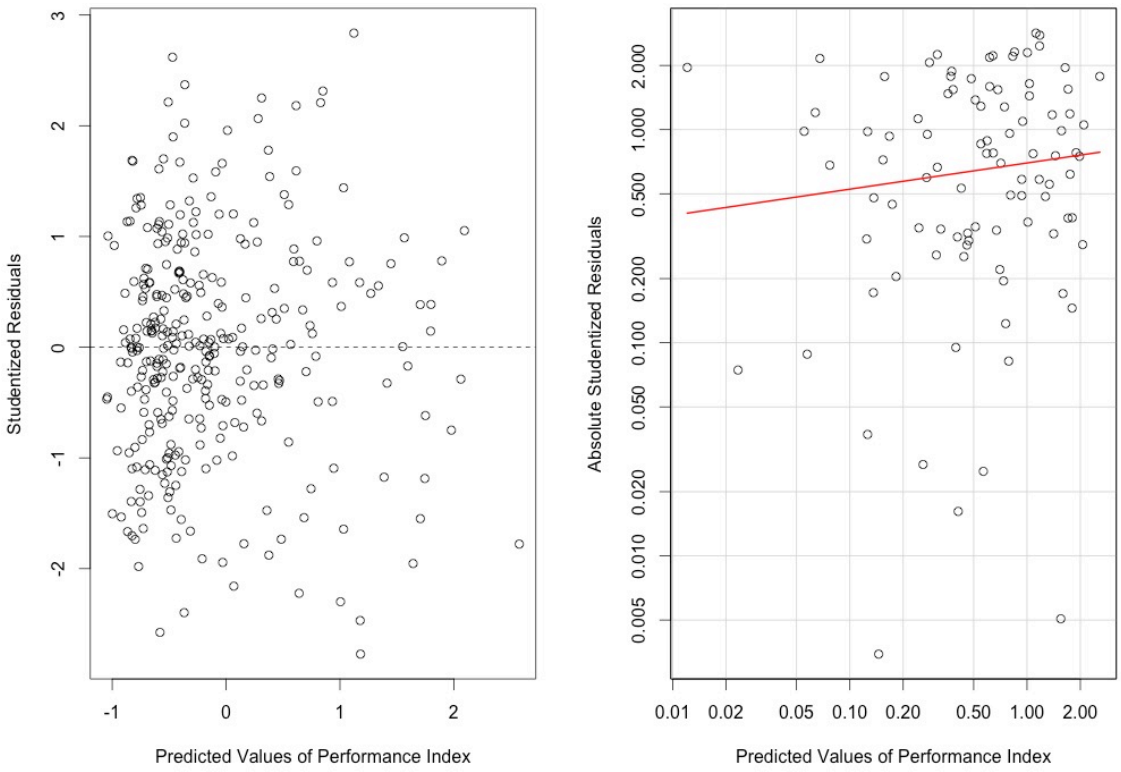

Figure 5–6 Checking non-constant error variance (heteroscedasticity)

5.6.3 Diagnostics of obligation model

Figure 5–7 identifies case #228 to be the most influential outlier and this case will be excluded. Figure 5–8 and Figure 5–9 confirm that residuals of Model 3 follow a normal distribution with mean of zero. But variance of residuals is not constant. Variance of error term gets larger when predicted performance index increases. The suggested power transformation of dependent variable is $Y^{0.9}$, which is almost identical to its linear form used in Model 3. Therefore, the only solution left is to calculate robust standard error.

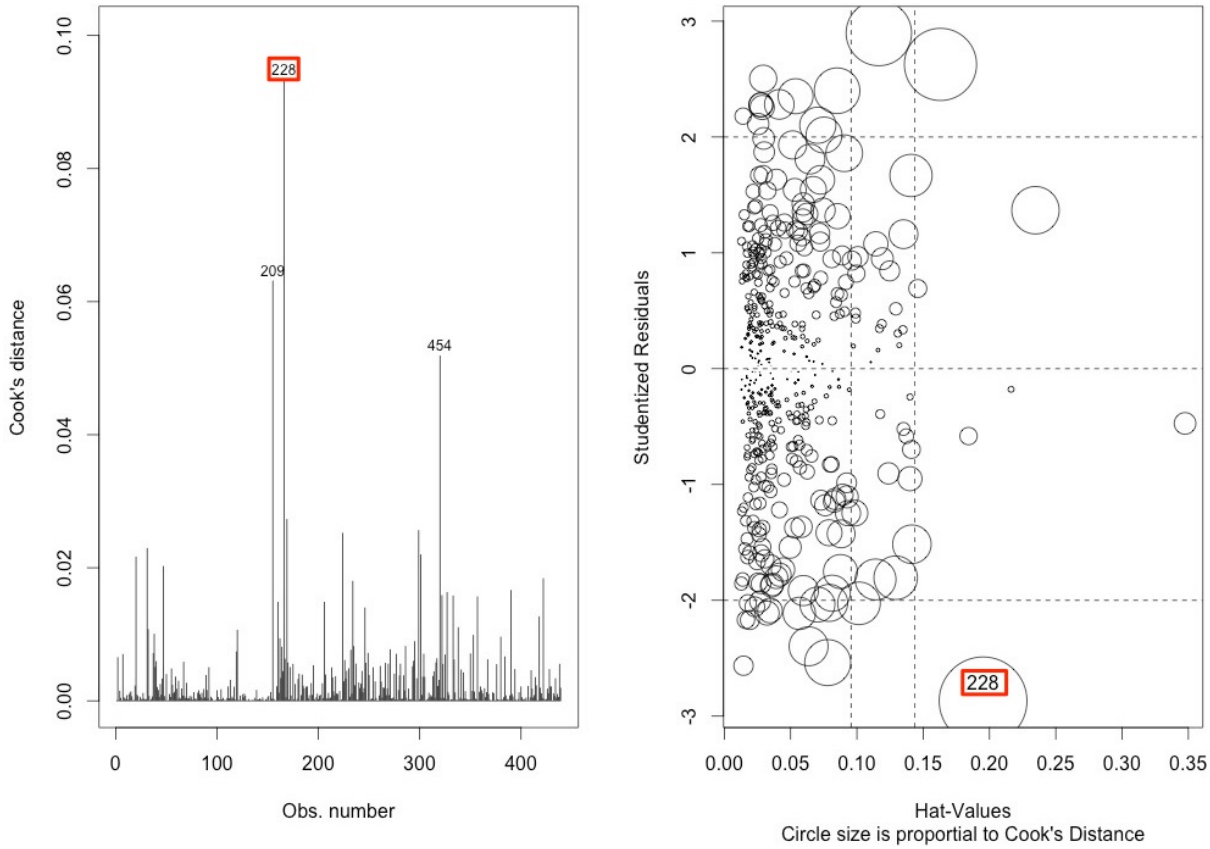

Figure 5–7 Cook's Plot and Influence Plot for observation with largest Cook's distance

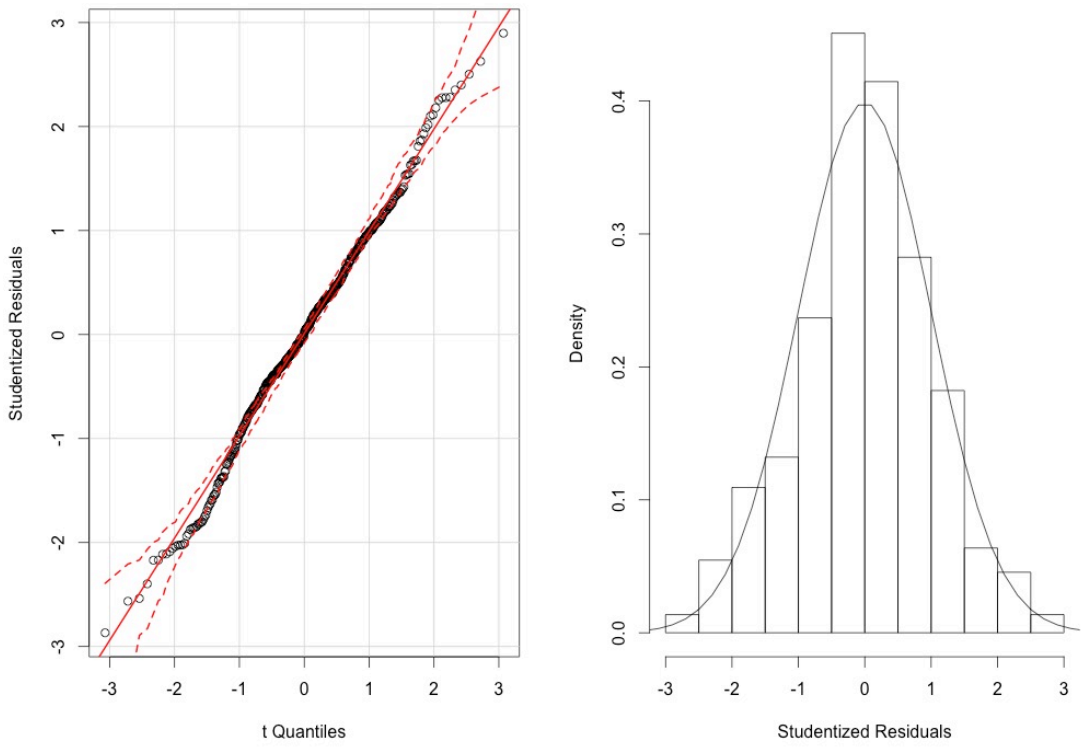

Figure 5–8 Checking normality with cumulative and density distribution plots of studentized residuals

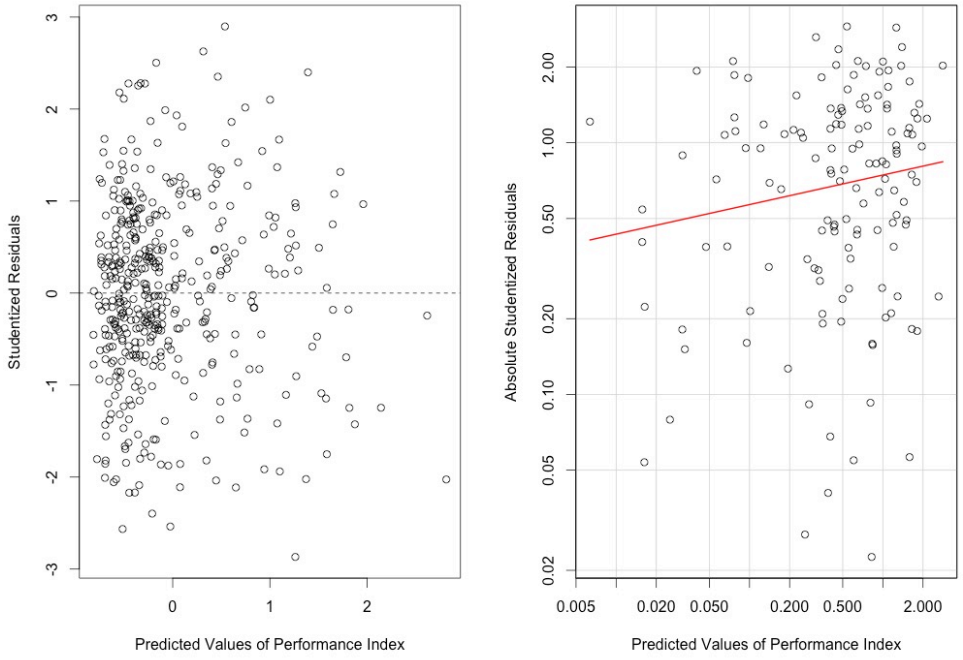

Figure 5–9 Checking non-constant error variance (heteroscedasticity)

To sum up, model diagnostics suggest that case #167 should be excluded from Model 1; case #165 and #304 should be excluded from Model 2; and case #228 should be excluded from Model 3. And standard errors of all three models in Table 5–10 must be replaced with robust standard errors.

After doing so, Table 5–11 presents the most valid empirical supports to my relational hypotheses of *guanxi* effects on performance. Model 1 in Table 5–11 supports RH-1. Comparing to similar SMEs with lower-than-median particularism, SMEs with high level of particularism perform significantly better (0.137, $p<0.05$) and this conclusion is a causal conclusion and this OLS model is not suffering from outlier influence and other assumption violations. Similarly, Model 2 in Table 5–11 confirms the causal effect of multiplexity on performance and supports RH-2. Comparing to similar SMEs that are low in multiplexity, SMEs with median and higher-than-median level of multiplexity perform significantly better (0.271, $p<0.001$). Finally, Model 3 supports RH-3. Comparing to similar SMEs, SMEs with higher level of obligation perform significantly better (0.155, $p<0.05$).

A comparison of models in Table 5–10 and Table 5–11 shows that after excluding most influential outliers, the model goodness-of-fit measured by adjusted-R-squared increases. Adjusted-R-squared for Model 1 increases from 0.479 to 0.494. This fit statistic also increases from 0.523 to 0.534 for Model 2 and from 0.465 to 0.475 for Model 3, respectively. Besides, robust standard errors tend to be bigger than standard errors calculated with classic OLS method, which makes hypothesis testing more conservative. Three relational hypothesis remain significant using larger standard errors, which further strengthen my conclusions of *guanxi*-based corporate social capital effects on business performance.

Table 5–11 OLS regression models with robust standard errors for causal effects of three *guanxi* dimensions on SME performance index using propensity-score-matched data; most influential outliers removed; all control variables omitted from this table

Performance Index	(1)	(2)	(3)
High in Particularism (Yes=1)	0.137*		
	(0.068)		
High in Multiplexity (Yes=1)		0.271***	
		(0.079)	
High in Obligation (Yes=1)			0.155*
			(0.064)
Adjusted R-square	0.494	0.534	0.475
N	341[a]	323[b]	438[c]

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001

[abc] Most influential outliers removed. Adjusted R-squares also increase due to outlier exclusions.

Chapter 6 Conclusions and Discussions

In this final chapter of the dissertation, I sum up the main findings from the statistical analysis of the survey, draw my conclusions in reference to the hypotheses proposed, and discuss the innovations, limitations, and implications of this study for future research.

6.1 Summary of findings

Using a survey of 830 Chinese SMEs in the Pearl River Delta Region, this study has been developed to examine the merits of non-relational and relational explanations of business performance, and the examinations of the causal effects of *guanxi*-based corporate social capital have been obtained through both OLS and counterfactual models. The main findings in Chapters 4 and 5 are summarized as follows.

Non-relational explanations of performance

Non-relational theories of business performance treat an enterprise as an open system that is actively adapting to or passively shaped by its external environments. Transaction cost theory explains performance by market environments. As a factor score of local market environment, the measure of transaction cost shows no significant effect ($p>0.05$) on business performance. Institutional theory, on the other hand, relates performance to legitimacy defined by institutional environments. As a sum of three dichotomous indicators, the variable of institutional legitimacy is positively and significantly related to performance (0.121, $p<0.001$). All other things equal, an SME equipped with an active Party's branch, a union, and a worker's congress at the same time yields 0.363 unit higher in performance index than a SME without any of these source of institutional legitimacy. Given the distribution of performance index, an increase of 0.363 is a large improvement. These results show that institutional legitimacy in China is highly politicized, reflecting

the nature and strong influence of an enduring Communist party-state regime despite a tremendous marketization process since 1978.

Relational explanations of performance

Relational explanations of business performance emphasize the productive features of three *guanxi* dimensions, i.e. particularism, multiplexity, and obligations.

Effects of these three *guanxi* dimensions on business performance are tested via OLS models in Chapter 4. The continuous measure of particularism shows a significant and positive effect (0.057, $p<0.05$ one-tailed) on performance. Cutting this continuous measure at its median, the resulting dummy measure puts the SMEs into higher- or lower-particularism categories, and this measure is also positive and statistically significant for performance. All other things equal, SMEs with a higher level of particularism tend to perform 0.144 ($p<0.001$) unit better in the performance index than their counterparts with a lower degree of particularism. Next, the continuous measure of multiplexity shows significant and positive effect on performance (0.181, $p<0.001$). Cutting this continuous measure at its median, the multiplexity dummy is also a significant and positive predictor (0.257, $p<0.001$) of performance. Finally, the continuous measure of obligation shows a positive and significant effect (0.068, $p<0.01$) on performance. The dichotomous measure of obligation (again setting median as the cutting point) also shows a significant and positive effect on performance (0.128, $p<0.05$).

Chapter 5 presents results of counterfactual models estimated to obtain the causal effects of endogenous *guanxi* measures. Models using Doubly Robust Estimators, propensity-score weighting, and propensity-score matching strategies consistently demonstrate the causal effects of the three dummy measures of *guanxi* on performance. By excluding influential outliers and calculating robust standard errors, models using propensity-score

matched data show significant causal effects of particularism (0.137, $p<0.05$), multiplexity (0.271, $p<0.001$), and reciprocal obligations (0.155, $p<0.05$) on performance index.

6.2 Conclusions

Findings summarized above support the following conclusions on how each of the three dimensions of *guanxi*-based corporate social capital facilitates business performance in the Chinese context.

6.2.1 Particularism

Particularism is productive. Social ties connecting a focal entrepreneur to his/her most important business partners are considered to be particular if both parties attach highly personalized sentiments and intimacy. Strong ties with high-level particularism generate information advantages. Insider-only business information is usually highly profitable and it only circulates among densely connected core members. Particularism as a precondition to join the core and enjoy productive information is therefore an important reason of business performance. Highly particular strong ties provide advantages of resource and influence as well. Exclusive resources and strong interpersonal influence are largely defined as favors in Chinese business culture. Usually, favors carry the potential to eventually get the business done. Like the circulation of insider-only information, effective favor exchanges tend to happen within small core circles where network members are densely connected via particular strong ties. Last but not least, particularism attaches strong interpersonal trust to business relations. In a society with very low level of general trust, Chinese businesspersons depend heavily on preexisting interpersonal sentiments to effectively monitor opportunistic behaviors. People connected via particular ties face more severe social sanctions and significantly heavier

emotional burdens to harm sentimental and intimate social connections due to opportunism. Thus, in a highly dynamic and institutionally uncertainty Chinese transition economy, a higher degree of particularism leads to better business performance.

6.2.2 Multiplexity

Multiplexity increases performance. Social ties carrying both business and non-business functions are defined as multiplexed ties. In the perspective of structural embeddedness, multiplexity embeds interconnected parties into several social networks, each of which is established to fulfill a given function. In the perspective of relational embeddedness, cost of breaking down a multiplexed tie tends to be higher than terminating a simplexed tie that focuses on only one specific function. As a result, multiplexed ties intertwine the ego and his/her alters closely in several social contexts and promote long-term and stable relations. Long-term and stable business relations boost business performance because of following two major reasons: (1) Frequent business transactions generate high-level trustworthiness based on sufficient past experience on partners' business ethics and their capability to fulfill contracts. (2) Repeated transactions generate mutual understanding of various business demands and visions, such as expected product quality, preferred delivery methods, effective negotiating channels and styles, potential innovations, roadmap of long-term business development, and etc. This mutual understanding leads to highly tailored contracts, flexible payment and delivery arrangements, quick and effective responses to disputes, and well-informed strategic initiatives, all of which generate short-term profits and long-term performance.

6.2.3 Obligations

Obligations nourish performance. Comparing to business giants, SMEs are more vulnerable to market fluctuations, opportunistic behaviors, and wrong decisions. This is particularly true for Chinese SMEs. Given institutionalized discriminations against private businesses in China's top-down economic reform, commercial and policy loans via formal channels disproportionately support financial needs of state-owned enterprises. Once facing crises, Chinese SMEs have no choice but to mobilize resources via informal conduits. Strong ties with socially coercive obligations to provide favors in time act as a safety net in this scenario. These favors can be direct financial supports. Comparing to high-cost and short-term borrowing from private capital and illegal underground banks, financial supports via strong-ties are provided as sentiment-rich favors between kin and pseudo-kin and usually carry low (or even no) interests and flexible repayment arrangements. These favors can also be in forms other than financial credits. Entrepreneurs embedded in this safety net can expect to receive, for examples, favorable business orders, new marketing channels, low-price raw materials, instructions of technical know-hows, and other tacit knowledge. All those financial and non-financial favors due to obligations in strong-ties shelter SMEs from unexpected impacts and ensure business surviving and performance.

6.2.4 *Guanxi* as an isotopic social capital

Facing the lack of formal financial supports, the lack of fair market competitions, and a lack of clear and enforceable legal regulations of business behaviors in the private sector, weak ties fail to provide sufficient resources and enough trust to sustain performance of Chinese SMEs. Instead, Chinese SMEs mobilize resources and build up business ethics in their *guanxi* networks and increase their performance using *guanxi*-based corporate social capital.

In China, *guanxi*-based corporate social capital acts as an isotopic substitution of weak-tie corporate social capital. First, *guanxi*-based corporate social capital enables

entrepreneurs to mobilize diversified resources via strong ties. Unlike strong ties in Western cultures, *guanxi* ties are strong ties that connect within and between kin and non-kin contacts. In daily social interactions, Chinese people follow the habitus to apply moral values and behavioral principles within the kinship networks (such as obligations to help each other, self-sacrifice, and unconditional trust) to non-kin contacts who are perceived to be emotionally and/or instrumentally important. By doing so in a differential association culture (Fei, 1992), Chinese people establish pseudo-kin relations and expand the scope of strong-tie networks to cover highly diversified non-blood network members. Second, *guanxi*-based corporate social capital excavates instrumental values of strong ties. Usually, *guanxi* ties are multiplexed strong ties that penetrate social spheres. Including *guanxi* contacts into business and non-business networks is a common practice of Chinese entrepreneurs. By doing so, strong ties can be used to fulfill both emotional and instrumental functions. Third, *guanxi*-based corporate social capital promotes commitments to reciprocal and long-term favor exchanges. A received favor does not need to and usually will not be repaid immediately. Instead, favor providers expect gradual repayments in a relatively long period of time, maybe several months but usually years. And a favor usually will not be repaid in the same kind: A favorable business order can be later repaid as detailed technology know-how; an emergency financial help can be repaid as low-price raw materials; and a new marketing channel will later be repaid by an exclusive investment opportunity. Such a heterogeneous nature of favor exchanges drastically diversifies network resource flows and makes *guanxi* ties less prone to the disadvantage of redundancy.

6.3 Discussions

As a first attempt to study how dimensions of *guanxi*-based corporate social capital causally determine business performance, I have made theoretical and methodological contributions to the research of social capital and *guanxi*, although my efforts are not free from limitations of measurements and modeling strategy.

6.3.1 Contributions

This study contributes to social capital theory. In this study, Chinese *guanxi* is conceptualized as an isotope of weak-tie-based social capital, and the productive features of its three analytical dimensions (namely, particularism, multiplexity, and reciprocal obligation) are discussed in reference to both a long tradition of guanxi research and the fast changing Chinese economy. By doing so, this study directly challenges the belief in the universal effectiveness of weak-tie social capital. Interviews and quantitative models show that Chinese entrepreneurs enable effective resource mobilizations and enforce proper business ethics via particular, multifunctional, and reciprocal strong ties for favor exchanges. Such a *guanxi*-based corporate social capital enriches our theoretical understanding of the cultural and social contingencies of social capital.

In addition, this study makes two methodological contributions. First, it measures attributes of *guanxi* ties using name generator, which captures existence, strength, quality, and moral values of *guanxi* ties between a focal entrepreneur and his/her three most important business partners. By doing so, this study addresses the methodological concern identified by Chen et al (2013) on the lack of *guanxi* research that uses standard network methods to quantitatively measure *guanxi* tie attributes. Measuring *guanxi* ties with name generator enables my study to investigate analytical dimensions of *guanxi*, which go beyond previous research that measures *guanxi* by frequencies of social networking activities (e.g. Gao, Xu, & Yang, 2008; Peng & Luo, 2000) and by costs to build and maintain *guanxi* (e.g. Y. Luo & Chen, 1997). The second methodological contribution is to evaluate causal effect of each dimension of *guanxi*-based corporate social capital on performance. Derived from four counterfactual models, my results forcefully demonstrate the existence of causal effects of *guanxi* on performance, free of the endogenous problems that are associated with social capital research in general (see (Mouw, 2003) for a critique) and Chinese *guanxi* studies in particular (see (Chen et al., 2013) for a most recent review).

6.3.2 Limitation of measurements

Performance. Because of missing values, three out of five measures of business performance are selected to construct a factor score of performance index. Compared to three selected indicators of total employees, fix assets, and annual tax, another two indicators of total sales and before-tax profit are more direct measures of performance. But total sales and before-tax profit were sensitive in the Chinese context and the survey used in this study had a majority of SMEs failed to provide answers. How to reliably measure revenue and profit of Chinese enterprises is a question that calls for attention from future researchers.

Multiplexity. In this research, multiplexity is defined as the overlapping of business and non-business functions provided by a social tie. This definition of multiplexity helps to answer why *guanxi* ties carrying business and non-business functions are productive. In daily business practice, however, multiplexity also refers to the overlapping of different business functions provided by a given social tie. That is to say, some business partners appear repeatedly in different business networks, such as networks of marketing, financing, information exchanging, and board interlocking. Multiplexity spanning business and social spheres and multiplexity within the business world could benefit and constrain entrepreneurs in different ways. In future research, questions capturing both types of multiplexity are needed to investigate such an important difference.

6.3.3 Limitations of counterfactual models

To solve the endogeneity problem of social capital measures, four analytical strategies in the counterfactual framework are conducted. This is a major methodological contribution to quantitative studies of Chinese *guanxi*. As a first attempt to analyze causal effects of

guanxi on performance, my modeling strategies are not free from limitations. Three major limitations are discussed here.

The first limitation is the lack of clear social meaning on dichotomizing continuous *guanxi* measures. Instead of a theory-driven approach that identifies a critical cutting point, a data-driven approach is used. When dichotomizing a continuous *guanxi* measure, I use its median as the cutting point so that the highest efficiency of propensity matching can be achieved. Median cuts a continuous distribution into two equal halves. Using median as the cutting point guarantees that observed treatment assignment status is balanced before propensity matching. This feature makes the matching algorithm generate a matched data with the largest sample size. If other cutting points were used, more cases would be excluded from the matched data. Take cutting point of 75-percentile as an example. This way of dichotomization generates a highly unbalanced distribution of observed treatment assignments: 25% of cases in the treatment group and 75% of cases in the control group. This strategy would generate 25% of cases in the treatment group and 25% of matched cases in the control group, resulting in a much smaller analytic sample size.

The second limitation of the counterfactual methods is its assumption that all confounders, interactions between confounders, and correct functional transformation of confounders are included in the selection model. This assumption can be very unrealistic. Confined to available data, 11 variables of attributes of enterprises and entrepreneurs are considered as confounders, all of which are theoretically and empirically related to performance and corporate social capital. However, those 11 variables are far from "all possible confounders" and we are never capable of measuring all confounders in any study. In future *guanxi* studies, two sets of confounders should be measured in addition to enterprise and entrepreneur attributes covered in this research. Occupational experience of entrepreneurs before they established their current enterprises is needed. In addition to that, personality, dispositions, values, and visions are highly

possible to affect business performance (See (Miner, 2002) for a complete review) and entrepreneurs' aptitude and strategies of social networking.

Finally, it is a technical problem to determine what kind of interactions and mathematical functions of confounders should enter the selection model. This technical problem is partially solved in this research by using Generalized Boosted Models (GBMs) to predict propensity scores. GBMs automatically include optimal transformations and interactions of confounders in the selection model, so that much more accurate propensity scores can be obtained. Like other machine learning techniques, the GBM is a prediction model rather than an explanation model. The GBM works as a black box and there is no way to see *how* confounders determine treatment assignments, even though social scientists usually want to know this underlying mechanism.

6.4 Implications for Future Research

As a pioneering study to integrate dimensions and productive features of Chinese *guanxi* into the social capital literature, my dissertation provides four important implications for future research.

The first implication is about improving *guanxi* measurements. In this study, attributes of *guanxi* ties are captured by name generator. This measurement strategy is very promising. It allows investigations of Chinese *guanxi* in an analytical way and enriches our vision of social capital diversity. In future research, position generator and a possible combination of name and position generators are needed to deepen our understanding of how *guanxi* facilitates resource mobility across social ladders and institutional boundaries (especially resource mobilizations across private and public sectors in China).

The second implication is about *guanxi* effects in a mixed economy. This study demonstrates productive features of *guanxi* on business performance of SMEs, most of which were privately owned. In the foreseeable future, China's reforms will still be

guided toward to maintaining the Communist party-state. Therefore, the long-term coexistence of state and private sectors is a fundamental feature of Chinese mixed economy, and consequently the future research of *guanxi*-based corporate social capital will be more promising if a greater scope of Chinese enterprises, both state and nonstate enterprises, can be included in empirical examinations to show how *guanxi* facilitate smooth cooperation and harmonic coexistence of enterprises within and between economic sectors.

The third implication is about the importance of enterprise-government *guanxi* ties. This study concludes the importance of *guanxi* ties between entrepreneurs based on survey data collected in 2003. Since 2003, domestic and international environments of China's economic growth have changed greatly. Among all macro-economic changes, we clearly observe increasing competitive advantages of giant state corporate players and a deepening penetration of foreign competitors to China's markets. China's private SMEs are less likely to survive such challenges alone without policy supports from local and central government. Future research, using new data from China, can generate more interesting findings by investigating the importance of private entrepreneurs' *guanxi* ties to government officials.

The last implication is further theoretical elaborations of isotopic corporate social capital via comparative research of business enterprises in Chinese and non-Chinese contexts. Isotopes of corporate social capital differ in configurations of relational, structural, and moral dimensions. This study introduces a corporate social capital isotope based on Chinese *guanxi* and confirms its causal effects on business performance of SMEs. The *guanxi*-based corporate social capital is clearly not the only isotope to boost business performance. Other configurations of relational, structural, and moral dimensions are highly likely to form productive social capital isotopes for entrepreneurs in other cultural contexts. Further empirical tests of this theoretical prediction using cross-cultural data will be helpful for identifying more contingencies of corporate social capital.

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Appendix A Full Regression Tables in Chapter 5

Table 5-1 Treatment effect models for causal effects of three *guanxi* dimensions on SME performance index

Average Treatment Effects (ATE)	**(1)**	**(2)**	**(3)**
High in Particularism (Yes=1)	0.005		
	(0.652)		
High in Multiplexity (Yes=1)		0.420	
		(0.721)	
High in Obligation (Yes=1)			0.456
			(0.540)
Probit Selection Models	Particularism (High=1)	Multiplexity (High =1)	Obligation (High =1)
Enterprise attributes			
Industries (Ref. = Furniture)			
Textile, dyeing, and finishing	-0.351^	-0.549**	0.282
	(0.187)	(0.199)	(0.176)
Metal processing	-0.565**	-0.662**	0.359^
	(0.193)	(0.207)	(0.184)
Fashion and garment	-0.146	-0.159	0.300
	(0.223)	(0.242)	(0.209)
Ceramics	-0.337	-0.490^	0.403
	(0.286)	(0.294)	(0.266)
Building materials	-0.467*	-0.385	0.585*
	(0.232)	(0.266)	(0.230)
Established year (Ref. = 1979-1991)			
1992 – 1999	0.091	0.154	-0.296*
	(0.144)	(0.146)	(0.144)
2000 – 2003	0.343^	0.145	-0.328^
	(0.184)	(0.183)	(0.176)
Ownership (Ref. = Collective owned)			
Private/family owned	-0.203	-0.096	0.966**
	(0.401)	(0.394)	(0.363)
FDI/Co.Ltd.	-0.271	-0.075	1.007*
	(0.422)	(0.426)	(0.395)
Has any affiliated enterprise (Yes=1)	1.088***	0.230	0.656**
	(0.290)	(0.239)	(0.236)
Is *Longtou* enterprise (Yes=1)	-0.156	0.232	0.306
	(0.231)	(0.253)	(0.244)
% of employees with education above HS/VHS	-0.002	-0.002	0.004
	(0.003)	(0.003)	(0.003)
Entrepreneur attributes			
Age (year)	0.067	0.042	-0.275
	(0.221)	(0.231)	(0.223)
Male (Yes=1)	-0.005	-0.008	-0.008
	(0.007)	(0.007)	(0.007)
Years of schooling	0.007	0.049*	0.000
	(0.024)	(0.025)	(0.024)
Party membership (Yes=1)	-0.262	-0.066	0.377*
	(0.186)	(0.193)	(0.189)
Job training experience (months)	-0.001	0.001	-0.014*
	(0.006)	(0.007)	(0.006)
Constant	0.936	0.722	-0.418
	(0.637)	(0.659)	(0.615)
Hyperbolic tangent of ρ	0.133	-0.122	-0.321
	(0.612)	(0.678)	(0.519)

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N = 570

Table 5-2 Inverse-Probability-Weighted Regression Adjustment (IPWRA) models for causal effects of three *guanxi* dimensions on SME performance index

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
	ATE	ATT	ATE	ATT	ATE	ATT
High in Particularism (Yes=1)	0.169**	0.190**				
	(0.060)	(0.064)				
High in Multiplexity (Yes=1)			0.208**	0.188*		
			(0.075)	(0.087)		
High in Obligation (Yes=1)					0.113*	0.112^
					(0.057)	(0.062)
Probit Selection Model	Particularism (High=1)		Multiplexity (High =1)		Obligation (High =1)	
Enterprise attributes						
Industries (Ref. = Furniture)						
Textile, dyeing, and finishing	-0.352^	-0.352^	-0.543**	-0.543**	0.277	0.277
	(0.186)	(0.186)	(0.195)	(0.195)	(0.173)	(0.173)
Metal processing	-0.569**	-0.569**	-0.654**	-0.654**	0.363*	0.363*
	(0.191)	(0.191)	(0.202)	(0.202)	(0.180)	(0.180)
Fashion and garment	-0.144	-0.144	-0.152	-0.152	0.291	0.291
	(0.223)	(0.223)	(0.233)	(0.233)	(0.203)	(0.203)
Ceramics	-0.351	-0.351	-0.475^	-0.475^	0.405	0.405
	(0.284)	(0.284)	(0.281)	(0.281)	(0.263)	(0.263)
Building materials	-0.468*	-0.468*	-0.366	-0.366	0.588**	0.588**
	(0.234)	(0.234)	(0.252)	(0.252)	(0.223)	(0.223)
Established year (Ref. = 1979-1991)						
1992 – 1999	0.091	0.091	0.152	0.152	-0.301*	-0.301*
	(0.144)	(0.144)	(0.147)	(0.147)	(0.143)	(0.143)
2000 – 2003	0.346^	0.346^	0.148	0.148	-0.328^	-0.328^
	(0.177)	(0.177)	(0.175)	(0.175)	(0.174)	(0.174)
Ownership (Ref. = Collective owned)						
Private/family owned	-0.187	-0.187	-0.092	-0.092	0.961*	0.961*
	(0.402)	(0.402)	(0.383)	(0.383)	(0.404)	(0.404)
FDI/Co.Ltd.	-0.257	-0.257	-0.060	-0.060	0.981*	0.981*
	(0.437)	(0.437)	(0.424)	(0.424)	(0.426)	(0.426)
Has any affiliated enterprise (Yes=1)	1.075***	1.075***	0.229	0.229	0.663**	0.663**
	(0.263)	(0.263)	(0.225)	(0.225)	(0.240)	(0.240)
Is *Longtou* enterprise (Yes=1)	-0.145	-0.145	0.238	0.238	0.273	0.273
	(0.230)	(0.230)	(0.240)	(0.240)	(0.222)	(0.222)
% of employees with education above HS/VHS	-0.002	-0.002	-0.002	-0.002	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Entrepreneur attributes						
Age (year)	0.064	0.064	0.047	0.047	-0.278	-0.278
	(0.234)	(0.234)	(0.235)	(0.235)	(0.229)	(0.229)
Male (Yes=1)	-0.005	-0.005	-0.008	-0.008	-0.008	-0.008
	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)
Years of schooling	0.006	0.006	0.050^	0.050^	0.001	0.001
	(0.025)	(0.025)	(0.026)	(0.026)	(0.023)	(0.023)
Party membership (Yes=1)	-0.266	-0.266	-0.066	-0.066	0.387*	0.387*
	(0.187)	(0.187)	(0.196)	(0.196)	(0.189)	(0.189)
Job training experience (months)	-0.001	-0.001	0.001	0.001	-0.014*	-0.014*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Constant	0.929	0.929	0.701	0.701	-0.388	-0.388
	(0.660)	(0.660)	(0.648)	(0.648)	(0.633)	(0.633)

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N = 570

Table 5-3 Propensity-score-weighted regression models for causal effects of three *guanxi* dimensions on SME performance index

	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
	ATE	ATT	ATE	ATT	ATE	ATT
High in Particularism (Yes=1)	0.142*	0.144*				
	(0.062)	(0.062)				
High in Multiplexity (Yes=1)			0.275***	0.275***		
			(0.067)	(0.068)		
High in Obligation (Yes=1)					0.112*	0.118*
					(0.057)	(0.057)
Institutional Legitimacy	0.095*	0.094*	0.102*	0.099*	0.102*	0.106**
	(0.047)	(0.046)	(0.048)	(0.047)	(0.040)	(0.041)
Enterprise attributes						
Industries (Ref. = Furniture)						
Textile, dyeing, and finishing	-0.259**	-0.258**	-0.300**	-0.295**	-0.301***	-0.281**
	(0.091)	(0.092)	(0.092)	(0.093)	(0.083)	(0.085)
Metal processing	-0.241**	-0.231*	-0.248**	-0.237*	-0.271**	-0.259**
	(0.091)	(0.091)	(0.092)	(0.093)	(0.083)	(0.085)
Fashion and garment	-0.075	-0.074	-0.132	-0.130	-0.104	-0.095
	(0.109)	(0.109)	(0.111)	(0.112)	(0.099)	(0.101)
Ceramics	0.705***	0.724***	0.702***	0.730***	0.715***	0.747***
	(0.164)	(0.163)	(0.175)	(0.173)	(0.150)	(0.151)
Building materials	0.046	0.041	-0.047	-0.038	0.016	0.013
	(0.118)	(0.118)	(0.111)	(0.111)	(0.112)	(0.114)
Established year (Ref. = 1979-1991)						
1992 – 1999	-0.015	-0.021	0.003	0.009	-0.006	-0.006
	(0.076)	(0.076)	(0.078)	(0.078)	(0.075)	(0.074)
2000 – 2003	-0.100	-0.107	-0.130	-0.127	-0.063	-0.073
	(0.101)	(0.101)	(0.097)	(0.098)	(0.095)	(0.095)
Ownership (Ref. = Collective owned)						
Private/family owned	0.176	0.175	0.038	0.040	0.017	0.026
	(0.198)	(0.197)	(0.188)	(0.189)	(0.196)	(0.200)
FDI/Co.Ltd.	0.615**	0.621**	0.429*	0.441*	0.421^	0.432^
	(0.211)	(0.209)	(0.206)	(0.206)	(0.216)	(0.220)
Has any affiliated enterprise (Yes=1)	0.205^	0.211^	0.253*	0.253*	0.295*	0.290*
	(0.121)	(0.120)	(0.118)	(0.117)	(0.119)	(0.118)
Is *Longtou* enterprise (Yes=1)	0.584***	0.567***	0.469**	0.455**	0.555***	0.538***
	(0.130)	(0.129)	(0.147)	(0.147)	(0.131)	(0.130)
% of employees with education above HS/VHS	0.012***	0.012***	0.014***	0.013***	0.012***	0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Entrepreneur attributes						
Age (year)	0.224*	0.228*	0.147	0.148	0.205*	0.201*
	(0.100)	(0.100)	(0.109)	(0.108)	(0.098)	(0.098)
Male (Yes=1)	-0.000	-0.000	-0.001	-0.001	0.000	0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Years of schooling	0.015	0.015	0.011	0.011	0.018	0.019
	(0.012)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)
Party membership (Yes=1)	0.325**	0.328**	0.328***	0.332***	0.284**	0.284**
	(0.105)	(0.105)	(0.097)	(0.097)	(0.094)	(0.093)
Job training experience (months)	0.007*	0.007^	0.007^	0.007*	0.007*	0.007^
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.954**	-0.952**	-0.766*	-0.761*	-0.782*	-0.815**
	(0.328)	(0.328)	(0.322)	(0.322)	(0.305)	(0.310)
Adjusted R-square	0.473	0.472	0.514	0.518	0.479	0.480

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001; N = 570

Table 5-10 OLS regression models for causal effects of three *guanxi* dimensions on SME performance index using propensity-score-matched data (nearest-neighbor matching with clippers = $0.25 \times S.D.(\widehat{pscore})$)

Average Treatment Effects	**(1)**	**(2)**	**(3)**
High in Particularism (Yes=1)	0.142*		
	(0.070)		
High in Multiplexity (Yes=1)		0.285***	
		(0.078)	
High in Obligation (Yes=1)			0.157*
			(0.066)
Institutional Legitimacy	0.079^	0.112*	0.119**
	(0.047)	(0.054)	(0.044)
Enterprise attributes			
Industries (Ref. = Furniture)			
Textile, dyeing, and finishing	-0.301*	-0.403**	-0.310**
	(0.117)	(0.133)	(0.106)
Metal processing	-0.181	-0.335*	-0.244*
	(0.117)	(0.136)	(0.108)
Fashion and garment	-0.043	-0.108	-0.170
	(0.149)	(0.160)	(0.123)
Ceramics	0.838***	0.730***	0.736***
	(0.176)	(0.186)	(0.155)
Building materials	0.202	-0.081	-0.002
	(0.145)	(0.165)	(0.136)
Established year (Ref. = 1979-1991)			
1992 – 1999	-0.071	-0.074	0.058
	(0.086)	(0.091)	(0.084)
2000 – 2003	-0.122	-0.226*	-0.016
	(0.106)	(0.113)	(0.106)
Ownership (Ref. = Collective owned)			
Private/family owned	0.196	0.043	0.072
	(0.261)	(0.237)	(0.215)
FDI/Co.Ltd.	0.615*	0.173	0.471*
	(0.270)	(0.257)	(0.229)
Has any affiliated enterprise (Yes=1)	-0.086	0.452**	0.335*
	(0.216)	(0.165)	(0.140)
Is *Longtou* enterprise (Yes=1)	0.627***	0.380*	0.448***
	(0.127)	(0.168)	(0.132)
% of employees with education above HS/VHS	0.012***	0.015***	0.010***
	(0.002)	(0.002)	(0.002)
Entrepreneur attributes			
Age (year)	0.232^	0.077	0.077
	(0.126)	(0.144)	(0.133)
Male (Yes=1)	-0.000	-0.005	-0.001
	(0.004)	(0.004)	(0.004)
Years of schooling	0.006	-0.003	0.015
	(0.015)	(0.017)	(0.014)
Party membership (Yes=1)	0.242*	0.284*	0.340**
	(0.114)	(0.125)	(0.120)
Job training experience (months)	0.009*	0.012*	0.007^
	(0.004)	(0.005)	(0.004)
Constant	-0.829*	-0.295	-0.688^
	(0.390)	(0.412)	(0.365)
Adjusted R-square	0.479	0.523	0.465
N	342	325	439

^ p<0.10; * p<0.05; ** p<0.01; *** p<0.001

Appendix B Simplified Mathematical Proofing of Doubly-robust Estimation (DRE)[29]

DRE defines ATE as the difference between two propensity-score-weighted averaged outcomes:

$$\begin{aligned}\hat{\Delta}_{DRE} = n^{-1}\sum_{i=1}^{n}\left[\frac{Y_i w_i}{e(\tilde{X}_i,\theta)} - \frac{w_i - e(\tilde{X}_i,\theta)}{e(\tilde{X}_i,\theta)} m_1\right] \\ - n^{-1}\sum_{i=1}^{n}\left[\frac{Y_i(1-w_i)}{1-e(\tilde{X}_i,\theta)} - \frac{w_i - e(\tilde{X}_i,\theta)}{1-e(\tilde{X}_i,\theta)} m_0\right] \\ = \hat{\mu}_{1,DRE} - \hat{\mu}_{0,DRE}\end{aligned}$$

where n is sample size, Y is the dependent variable; w is the treatment assignment, $e(\tilde{X}_i,\theta)$ is the estimated propensity score; m_1 represents Equation 5-5 when $w_i = 1$; and m_0 represents Equation 5-5 when $w_i = 0$.

Due to the Law of Large Numbers:

$$\begin{aligned}E(\hat{\mu}_{1,DRE}) &= E\left[\frac{Yw}{e(\tilde{X},\theta)} - \frac{w - e(\tilde{X},\theta)}{e(\tilde{X},\theta)} m_1\right] \\ &= E\left[\frac{Y^1 w}{e(\tilde{X},\theta)} - \frac{w - e(\tilde{X},\theta)}{e(\tilde{X},\theta)} m_1\right] \\ &= E\left[Y^1 + \frac{w - e(\tilde{X},\theta)}{e(\tilde{X},\theta)}(Y^1 - m_1)\right]\end{aligned}$$

[29] This simplified mathematical proofing is based on following contributions:

Lunceford, J., and Davidian, M., 2004, "Stratification and Weighting via the Propensity Score in Estimation of Causal Treatment Effects: A Comparative Study", *Statistics in Medicine*, 23, 2937-2960.

Tan, Z., 2010, "Bounded, Efficient and Doubly Robust Estimation with Inverse Weighting", *Biometrika*, 97(3), 661-682.

Funk, M., Westreich, D., Wiesen, C., Stürmer, T., Brookhart, M., and Davidian, M., 2011, "Doubly Robust Estimation of Causal Effects", *American Journal of Epidemiology*, 173(7), 761-767.

Słoczyński, T., and Wooldridge, J., 2014, "A General Double Robustness Result for Estimating Average Treatment Effects", *Institute for the Study of Labor (IZA) Discussion Paper No. 8084*.

$$= E(Y^1) + E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}(Y^1 - m_1)\right]$$

If the OLS outcome model is correctly specified but the selection model is subject to misspecifications, then we have $m_1 = E(Y|w = 1, X) = E(Y^1|X)$ and the second term in above equation is zero because:

$$\begin{aligned}
E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}(Y^1 - m_1)\right] &= E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}\big(Y^1 - E(Y|w = 1, X)\big)\right] \\
&= E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}\big(Y^1 - E(Y|w = 1, X)\big)|w, X\right] \\
&= E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}E\big[\big(Y^1 - E(Y|w = 1, X)\big)|w, X\big]\right] \\
&= E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}[E(Y^1|w, X) - E(Y|w = 1, X)]\right] \\
&= E\left[\frac{w - e(\tilde{X}, \theta)}{e(\tilde{X}, \theta)}\left[\underbrace{E(Y^1|X) - E(Y^1|X)}_{this\ part\ is\ zero}\right]\right] = 0
\end{aligned}$$

That is to say that as long as the outcome model is correctly specified, the $\hat{\mu}_{1,DRE}$ is a consistent estimator of $E(Y^1)$ even if the selection model is not correctly specified. Similar logic leads to the conclusion that $\hat{\mu}_{0,DRE}$ is a consistent estimator of $E(Y^0)$. Combining those two conclusions together, $\hat{\Delta}_{DRE}$ is a consistent estimator of the population parameter of ATE.

Appendix C Background Attributes of Enterprises and Entrepreneurs Used in Estimating Propensity Scores with Generalized Boosted Models

Predicting variables used in GBMs for each *guanxi* dimension measure

***Guanxi* dimensions**	**Predicting variables in GBM**
Particularism	• Attributes of enterprises o Has affiliated enterprise o Is *Longtou* enterprise o % of employees with high/vocational school degrees • Attributes of entrepreneurs o Age in 2003 o Years of schooling o Job training experience
Multiplexity	• Attributes of enterprises o Has affiliated enterprise o Is *Longtou* enterprise o % of employees with high/vocational school degrees • Attributes of entrepreneurs o Age in 2003 o Years of schooling o Party membership o Job training experience
Obligations	• Attributes of enterprises o Has affiliated enterprise o % of employees with high/vocational school degrees • Attributes of entrepreneurs o Age in 2003 o Years of schooling o Party membership o Job training experience

* Variables in each GBM have influence greater than 2%.

Appendix D Propensity-score Weighting Scheme

A scheme of using estimated propensity score as sampling weights for average treatment effect (ATE) and average treatment effect on treated (ATT)

Observed treatment assignment	Average treatment effect (ATE)	Average treatment effect on treated (ATT)
Cases in treatment group	1/ps	1
Cases in control group	1/(1-ps)	ps/(1-ps)

Appendix E Summary Statistics of Propensity-score Weights

Propensity weights	Mean	S.D.	Min	Max
ATE* of particularism	1.964	0.739	1.289	3.992
ATT** of particularism	1.322	0.496	0.976	2.992
ATE of multiplexity	1.911	0.861	1.216	5.278
ATT of multiplexity	1.335	0.613	0.834	4.278
ATE of obligation	1.944	0.247	1.451	2.725
ATT of obligation	1.036	0.167	0.451	1.725

Note: N = 816; * ATE = Average Treatment Effect;
** ATT = Average Treatment Effect for the Treated